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THE JOURNAL OF
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A MATHEMATICAL THEORY OF PRICE AND PRODUCTION FLUCTUATIONS AND ECONOMIC CRISES

I. INTRODUCTION

1. *Statement of the problem.*—Various papers and treatises have appeared exhibiting curves and statistics indicating that prices periodically oscillate about a given price trend.[1] Other investigations have indicated a series of plus and minus deviations from a given datum line which pass through definite phases but do not recur with strict periodicity.[2] Still other papers have indicated plus and minus deviations which do not reveal definite characteristic phases and do not recur.[3] In spite of these researches, no successful attempt to relate the theory of business cycles with economic theory has been made. It is this problem which I attack here.

2. *Methods of procedure.*—I make use of the theoretical results which I have obtained in developing a dynamical theory of economics[4] to show that there actually seems to be a general mathe-

[1] For example, H. L. Moore, *Economic Cycles: Their Law and Cause* (1914).

[2] W. C. Mitchell, *Business Cycles*, National Bureau of Economic Research (1927).

[3] Irving Fisher, "The Business Cycle Largely a Dance of the Dollar," *Jour. Amer. Stat. Assoc.*, Vol. XXVIII (1923).

[4] C. F. Roos, "A Mathematical Theory of Depreciation and Replacement," *Amer. Jour. Math.*, L (1928), 147–57, hereafter designated "I." On pages 153–54 this paper contains several algebraical and clerical errors which are corrected here. See also, Roos, "A Dynamical Theory of Economics," this *Journal*, XXXV

matical theory which co-ordinates the results of the various aforementioned economists and others and predicts certain new results worthy of careful investigations. My theory is, furthermore, stated in an exact mathematical form which not only shows how the various "causes" influence the formation of a business cycle but also assigns to each influencing factor a place of measurable importance.

For simplicity I begin with a study of the problem of monopoly from a dynamic viewpoint, and then generalize my methods to obtain theories of association or co-operation and two kinds of competition. Upon these dynamic theories, which are given here for the first time, I build a simple mathematical theory of business cycles. Much of the mathematics is difficult, and for that reason the non-mathematical reader is advised to take sections 5 and 6 and the latter part of 9 for granted. Those readers who are familiar with integral and differential calculus should be able to follow the rest of the work without difficulty.

II. THE PROBLEM OF MONOPOLY

3. *The dynamic laws of demand and supply.*—Let $y(t)$ represent the amount of a commodity C sold per unit time at the time t. I assume that the demand (sales) for C depends upon the price, $p(t)$, and the rate of change of price, dp/dt. With G. C. Evans,[5] I take this to be a linear relation and write

$$y(t) = \bar{a}p(t) + \bar{b} + \bar{h}p'(t)\,, \tag{3.1}$$

where $\bar{a}$, $\bar{b}$, and $\bar{h}$ are constants and here and throughout this paper primes denote derivatives with respect to time, i.e., $p'(t) = dp/dt$.

(1927), 632–56, hereafter designated "II." The initial paper in this direction was that of G. C. Evans, "The Dynamics of Monopoly," *Amer. Math. Monthly*, Vol. XXXI (1924).

[5] G. C. Evans, *op. cit.* Recently L. Amoroso has criticized this relation. In his paper, "Le equazioni differenziali della dinamica economica," *Giornale degli Economisti*, XLIV (1929), 68–79, footnote on pp. 69–70, he says that this assumes that the price is a parallel to the axis of amount. This criticism is based on an almost unbelievable mathematical mistake and is therefore invalid. If one writes $y(t) = p + p'$, as the demand equation, and solves for p when $y = mt$, Amoroso's error will become apparent.

As Evans has pointed out, $\bar{a}<0$ and $\bar{b}>0$, since a high price results in a small demand and when the price decreases the demand is large and positive. I leave the sign of $\bar{h}$ undetermined, although in most practical cases $\bar{h}>0$.

Let $u(t)$ represent the amount of goods produced per unit time at the time t. In general the demand $y(t)$ will not be equal to $u(t)$, for part of $u(t)$—say $\gamma u(t)$—plus part of existing stocks will be consumed at the time t; part of $u(t)$ will go into stocks on hand. I may typify this situation by writing

$$y(t)=\gamma u(t)+\int_{t_0}^{t} f(t,\tau)u(\tau)d\tau\ , \qquad (3.2)$$

where, in the general problem, γ will be a function of the time and τ refers to a variable time. In my theory I assume $\gamma=a$ *constant* and $f(t,\tau)\equiv 0$, that is, the amount consumed is supposed to be equal to, or less than, the amount produced. Under these assumptions we may write

$$u(t)=ap(t)+b+hp'(t)\ , \qquad (3.3)$$

where a, b, and h are respectively $\bar{a}$, $\bar{b}$, and $\bar{h}$ divided by γ and hence have the same algebraic signs as the corresponding barred letters.

4. *Cost of production and profit.*—I have already suggested that the coefficients of production (quantities of the services of the factors of production, i.e., services of land, persons, and capital that enter into the manufacture of a unit of a given commodity) are in general functions of the type

$$f_\alpha(u,u',p,p',t)\ , \qquad (\alpha=1,2,\ldots,m)$$

where $u(t)$ is the amount of a commodity or service C produced per unit time and $p(t)$ stands for the set of prices consisting of the price of C and the prices $p_1,\ldots,p_m$ of the m other commodities and services required to manufacture and sell one unit of C.[6] The

[6] Roos, II; and Roos, "The Problem of Depreciation in the Calculus of Variations," *Bull. Amer. Math. Soc.*, XXXIV (1928), 219. The latter paper will hereafter be designated "III."

cost of producing and marketing $u(t)$ units of C unit per time will then be given by

$$\sum_{a=1}^{m} u(t) f_a(u, u', p, p', t) p_a(t) ,$$

which for convenience I call $Q(u, u', p, p', t)$.

The total net profit to the producer over the period of time (t_1, t_2), discounted to the time t_1, will then be given by the integral

$$\pi = \int_{t_1}^{t_2} [\gamma p u - Q(u, u', p, p', t)] E(t_1, t) dt ,$$

where $E(t_1, t)$ is the discount factor *exponential* $\left(-\int_{t_1}^{t} \delta(r) dr\right)$ and $\delta(r)$ is the force of interest which may be defined as the rate of increase of an invested sum S divided by S.[7] Here the variables are functions of the time, $u(t)$ and $p(t)$, whereas for Cournot, Walras, Pareto, and others they are numbers p and $D = \int_0^1 u(t) dt$.

If we take $\gamma = 1$, $\delta = 0$, $t_1 = 0$, $t_2 = 1$, and $Q(u, u', p, p', t) \equiv Q(u(t-\mu))$, where μ is a kind of lag number, the integral π becomes

$$\pi_1 = \int_0^1 [p(t) u(t) - Q(u(t-\mu))] dt .$$

Since $p(t)$ and $u(t)$ are continuous and $u(t) \geq 0$ on the interval (t_1, t_2), we can apply the first mean-value theorem of the integral calculus[8] to π_1 and write

$$\pi_1 = p(\xi_1) \int_0^1 u(t) dt - Q(u(\xi_2 - \mu))$$

$$= p(\xi_1) D - Q(u(\xi_2 - \mu)) .$$

For a proper choice of μ, positive or negative, this last expression can be put in the form

$$\pi_1 = p(\xi_1) D - Q(D) .$$

[7] See, for example, L. L. Smail, *Mathematics of Finance* (1925), p. 156.

[8] E. W. Hobson, *Theory of Functions of a Real Variable* (1927), I, 617.

Cournot would have written, $\pi_1 = pD - \varphi(D)$, where in our notation $\varphi(D) = Q(D)$, and chosen p and D satisfying a static law of demand $D = F(p)$ so that π_1 would be a maximum.[9]

I propose to *choose $u(t)$ and $p(t)$ satisfying the differential equation of demand-supply* (3.3) *so that the integral π is a maximum.* Professor Evans introduced the concept of profit over an interval of time and considered the corresponding problem when $\gamma = 1$, $\delta = 0$ (interest neglected), and $Q(u, u', p, p', t) \equiv Au^2 + Bu + C$. These restrictive assumptions prevented him from obtaining solutions typical of our economic society.

In order to obtain an explicit solution, I must make further hypotheses concerning the coefficients of production $f_a(u, u', p, p', t)$.

Let us consider first the case for which f_a is a function of only u, p, and t, and write

$$f_a(u, p, t) = a_a u(t) + g_a(p_1, \ldots, p_m, t) + b_a + c_a/u(t) . \quad (4.4)$$

In particular, the coefficients[10] determined by technical conditions alone will be given by taking $g_a = 0$; those which are compensatory, by taking $a_a = b_a = c_a = 0$; and finally those which are constant, by taking $a_a = g_a = c_a = 0$. Again, if b_a and g_a are positive constants, the graph of the coefficient of production as a function of the rate of production is a hyperbola, since the discriminant is one.

In general, the unit cost of production decreases up to a certain production rate and then increases again due to overcrowding, bidding for labor, lax management, and so forth. This situation can be typified by assuming $\sum_{a=1}^{m} a_a p_a > 0$, $\sum_{a=1}^{m} (g_a + b_a) p_a > 0$ and $\sum_{a=1}^{m} c_a p_a > 0$.

If the constant c_a is replaced by the expression $c_{1a} + c_{2a}u'(t) + c_{3a}[u'(t)]^2 + c_{4a}p'(t) + c_{5a}[p'(t)]^2$, where the c_{ia} are constants, the total cost function, $Q(u, u', p, p', t)$, becomes

$$Q(u, u', p, p', t) = Au^2 + Bu + C + Du'u' + Fp'p' + Gp' + Hu' , \quad (4.5)$$

[9] A. Cournot, *Mathematical Principles of the Theory of Wealth*, pp. 56–66.

[10] For a discussion of the various kinds of coefficients of production, see Henry Schultz, "Marginal Productivity and the General Pricing Process," *Jour. Pol. Econ.*, XXXVII (1929), 505–51.

where, by definition, $A=\Sigma a_\alpha p_\alpha$, $B=\Sigma(b_\alpha+g_\alpha)p_\alpha$, $C=\Sigma C_{1\alpha}p_\alpha$, $D=\Sigma c_{2\alpha}p_\alpha$, $F=\Sigma c_{3\alpha}p_\alpha$, $G=\Sigma c_{4\alpha}p_\alpha$, $H=\Sigma c_{5\alpha}p_\alpha$, and the summations are all taken from 1 to m (the number of services and commodities required to manufacture one unit).

Usually F and G should be small positive quantities. If production is maintained at the constant rate $u(t)=0$, then $Q=C+Fp'p'+Gp'$, from which it follows that C is the overhead cost at a constant price, $p(t)$. When the cost of production does not depend upon the acceleration of production and the rate of change of price, the marginal unit cost, dQ/du becomes $2Au+B$, so that B is the marginal unit cost when $u=0$.

For simplicity I assume in the early part of this paper that A, B, ... , H, and δ are constants for the interval (t_1, t_2). This hypothesis would be satisfied if each a_α, b_α, g_α, $c_{i\alpha}$, and p_α ($\alpha=1$, ... , m; $i=1$, ... , 4) were constant, but is much less restrictive. For example, p_1 may increase, p_2 decrease, a_1 increase, a_2 decrease, and yet $A=\Sigma a_\alpha p_\alpha$ remain constant. At the end of the paper A, ... , H, and δ may be supposed to vary by finite jumps.

Someone might wish to say that total unit cost never attains a minimum, and prefer to write $A<0$. If one makes this hypothesis, he must confine himself to that part of the unit-cost curve which is between the limits $u=0$ and $u=-B+\sqrt{B^2-4AC}/2A$, since for greater values of u the unit cost is negative. For the sake of completeness, I consider both of the cases $A>0$ and $A<0$.

5. *Inequalities and boundary conditions.*—For purposes of convenience I collect the inequalities already obtained in the following table:

$A>0$ *or* $A<0$	
$B>0$	$H>0$
$C>0$	$\delta>0$
$D>0$	$a>0$
$F\geq 0$	$b>0$
$G\geq 0$	$\gamma>0$

I suppose that at the time $t_1=\tau_1$ the producer is producing, or proposes to produce, u_1 units of which γu_1 are sold at the price p_1, that is,

$$t_1-\tau_1=u(t_1)-u_1=p(t_1)-p_1=0. \tag{5.2}$$

The conditions at the end of the interval of time are to be determined by maximum profit considerations.[11] In other words, my problem is a variable end-point problem in the calculus of variations.

In particular, the price $p(t_1)$ and the rate of production $u(t_1)$ may be the so-called "equilibrium values" if equilibrium exists at t_1.[12] The present paper indicates, however, that economic equilibrium is a very fleeting thing, if not a will-o'-the-wisp; and for that reason the reader should not always interpret our conditions in terms of equilibrium. The end conditions apply to much more general situations.

The first part of my paper is independent of the choice of end conditions, since I concern myself only with families of price curves containing unspecified parameters of integration ordinarily fixed by end conditions.

6. *Solution of the problem of monopoly.*—Consider the case of a monopolist producing a commodity C, who knows the dynamic law of demand (3.3) and his cost of production as a function of $u(t)$, $u'(t)$, and $p'(t)$, defined by (4.5). If he has already been operating his business up to the present time $t_1=\tau_1$, at this time he will be producing $u(t_1)=u_1$ units per unit time, and γu_1 of these units will be selling at a price $p(t_1)=p_1$, that is, conditions (5.2) will hold. Suppose that his plant is sufficiently large to supply the demand at any time of the interval (t_1, t_2). At any time that it is not, he will operate at full capacity.

If our producer's sole aim is profit, his problem may be taken to be that of choosing the rate of production $u(t)$ and the price $p(t)$, satisfying the differential equation of demand-supply

$$u(t)=ap(t)+b+hp'(t) \tag{6.1}$$

and having end values satisfying the conditions (5.2) so that the total net discounted profit

$$\pi=\int_{t_1}^{t_2}[\gamma pu-Au^2-Bu-C-Du'u'-Fp'p'-Gp'-Hu']E(t_1, t)dt$$

is a maximum.

[11] For a more general discussion of end conditions see "II" and my paper "Some Problems of Business Forecasting," *Proc. Nat. Acad. Sci.*, March, 1929, hereafter called "IV."

[12] V. Pareto, *Manuel d'économie politique* (1909), pp. 144–248.

In a problem of ordinary maxima and minima of functions of a point one seeks to find particular values of one or more parameters defining the largest (smallest) value of the function in a particular neighborhood. In the problem just stated I seek to find, not numbers, but rather functions $u(t)$ and $p(t)$ satisfying (5.2) so that the function of a curve defining the profit is a maximum. This is a problem in the calculus of variations of the Lagrange type.[13]

It is well known that the desired functions $u(t)$ and $p(t)$ must satisfy (6.1) and the Euler-Lagrange differential equations

$$\partial W/\partial p=(d/dt)\partial W/\partial p' \text{ and } \partial W/\partial u=(d/dt)\partial W/\partial u' , \quad (6.2)$$

where, by definition, $W=[\gamma pu-Au^2-Bu-C-Du'u'-\ldots.$ $-Hu'+\lambda(t)(u-ap-b-hp')]E(t_1, t)$ and $\lambda(t)$ is a function of t used as a Lagrange multiplier.[14]

When I perform the differentiations indicated in (6.2), I find that I can almost immediately eliminate $\lambda(t)$ and $u(t)$ from these equations and (6.1) and obtain a fourth-order differential equation in $p(t)$,

$$L_4d^4p/dt^4+L_3d^3p/dt^3+L_2d^2p/dt^2+L_1dp/dt+L_0p-p_0=0 , \quad (6.3)$$

where, by definition,[15]

$$\begin{aligned} L_4&=-2h^2D \\ L_3&=4Dh^2\delta \\ L_2&=2Ah^2+2ahD\delta-2Dh^2\delta^2+2a^2D+2F \\ L_1&=-2\delta[Ah^2+aD(a+h\delta)+F] \\ L_0&=2a(\gamma-Aa)+h\delta(\gamma-2aA) \\ p_0&=(a+h\delta)(B+H\delta)+G\delta+b[\gamma-2A(a+h\delta)] . \end{aligned} \quad (6.4)$$

[13] See J. Hadamard, *Leçons sur le calcul des variations* (1910), p. 217, or E. Goursat, *Cours d'analyse mathématique* (1927), III, 575.

[14] For an elementary discussion of the multiplier method in the calculus of variations, see W. F. Osgood, *Advanced Calculus* (1929), p. 180. For a more advanced study, see G. A. Bliss, 'Lectures on the Calculus of Variations," mimeographed by O. E. Brown, Northwestern University, or my paper, "A General Problem of Minimizing an Integral with Discontinuous Integrand," *Trans. Amer. Math. Soc.*, XXXI (1929), 58–70. Hereafter called "V."

[15] These equations differ from the corresponding equations in "I" due to an error made there.

The usual method for solving a differential equation with constant coefficients of the type (6.3) is to substitute $p=e^{mt}$ in the homogeneous equation and solve the resulting quartic equation for its four roots m_1, m_2, m_3, and m_4. The solution of (6.3) is then the general solution of the homogeneous equations plus a particular solution of (6.3), that is,

$$p(t)=p_0/L_0+K_1e^{m_1t}+K_2e^{m_2t}+K_3e^{m_3t}+K_4e^{m_4t}\,, \tag{6.5}$$

where $K_1, \ldots, K_4$, are arbitrary constants and $m_1, \ldots, m_4$, are the four roots (assumed distinct) of the quartic equation

$$L_4m^4+L_3m^3+L_2m^2+L_1m+L_0=0\,.$$

The rate of production $u(t)$ can now be determined immediately by substituting (6.5) in (6.1). I obtain,

$$u(t)=ap_0/L_0+b+(a+hm_1)e^{m_1t}+\cdots+(a+hm_4)e^{m_4t}\,. \tag{6.6}$$

If two roots, say m_3 and m_4, are imaginary, that is, $m_3=\bar{\alpha}_1+\bar{\beta}_1i$, $m_4=\bar{\alpha}_1-\bar{\beta}_1i$, $i=\sqrt{-1}$, the solution (6.5) becomes[16]

$$p(t)=p_0/L_0+K_1e^{m_1t}+K_2e^{m_2t}+e^{\bar{\alpha}_1t}[K_3\cos\bar{\beta}_1t+K_4\sin\bar{\beta}_1t]\,,$$

which may also be written in the form

$$p(t)=p_0/L_0+K_1e^{m_1t}+K_2e^{m_2t}+C_1e^{\bar{\alpha}_1t}\sin(\bar{\beta}_1t+C_2)\,, \tag{6.7}$$

where $C_1=\sqrt{K_3^2+K_4^2}$ and $C_2=\sin^{-1}K_3/C_1=\cos^{-1}K_4/C_1$ and hence are arbitrary.

Since the quartic is of the fourth degree and all roots have been assumed distinct, the only other possibility is that I have four imaginary roots. For this case (6.5) becomes

$$p(t)=p_0/L_0+C_1e^{\bar{\alpha}_1t}\sin(\bar{\beta}_1t+C_2)+C_3e^{\bar{\alpha}_2t}\cos(\beta_2t+C_4)\,. \tag{6.8}$$

[16] See W. F. Osgood, *op. cit.*, p. 336.

When two roots are identical, solutions of the following forms are possible:

$$p(t) = p_0/L_0 + (K_1 + K_2 t)e^{m_1 t} + K_3 e^{m_3 t} + K_4 e^{m_4 t}\,, \tag{6.9}$$

$$p(t) = p_0/L_0 + (K_1 + K_2 t)e^{m_1 t} + C_1 e^{\bar{\alpha}_1 t}\sin(\bar{\beta}_1 t + C_2)\,,$$

$$p(t) = p_0/L_0 + e^{\bar{\alpha}_1 t}[(C_1 + C_2 t)\cos\bar{\beta}_1 t + (C_3 + C_4 t)\sin\bar{\beta}_1 t]\,. \tag{6.10}$$

When three and four roots are identical, the solutions are, respectively,

$$p(t) = p_0/L_0 + (K_1 + K_2 t + K_3 t^2)e^{m_1 t} + K_4 e^{m_4 t}\,, \tag{6.11}$$

and

$$p(t) = p_0/L_0 + (K_1 + K_2 t + K_3 t^2 + K_4 t^3)e^{m_1 t}\,. \tag{6.12}$$

Although it is possible that one might obtain multiple roots in an actual example, it will be to advantage to simplify the theory and save space by assuming that all roots are distinct, since, if they are not, a small change in one of the *statistical* constants, $A, \ldots, H, \delta$, will make them so.

By means of the inequalities (5.1) and the equations of definition (6.4), it can be shown that the following inequalities hold:

$A > 0$	$A < 0$	
$L_4 < 0$	$L_4 > 0$	
$L_3 > 0$	$L_3 > 0$	
$L_2 > 0$	L_2	arbitrary sign
$L_1 < 0$	L_1	
L_0 arbitrary sign	$L_0 < 0$	

(6.13)

If I denote the numerical value of L_i by l_i, the inequalities (6.13) tell that all possible quartic equations are included in

$$-l_4 m^4 + l_3 m^3 \pm l_2 m^2 \pm l_1 m \pm l_0 = 0\,.$$

Let α_i be the numerical values of the real part of the corresponding m_i, and let β_i be the numerical value of the imaginary part. Then, by *Descartes' rule of signs*,[17] it can be shown that all possible

[17] W. L. Hart, *College Algebra* (1926), p. 216.

solutions $p(t)$ of the problem proposed are included in the following set:

$$p(t) = p_0/L_0 + K_1 e^{-\alpha_1 t} + K_2 e^{-\alpha_2 t} + K_3 e^{\alpha_3 t} + K_4 e^{\alpha_4 t} \tag{6.14}$$

$$p(t) = p_0/L_0 + K_1 e^{-\alpha_1 t} + K_2 e^{-\alpha_2 t} + K_3 e^{\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.15}$$

$$p(t) = p_0/L_0 + K_1 e^{-\alpha_1 t} + K_2 e^{-\alpha_2 t} + K_3 e^{-\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.16}$$

$$p(t) = p_0/L_0 + K_1 e^{\alpha_1 t} + K_2 e^{\alpha_2 t} + K_3 e^{-\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.17}$$

$$p(t) = p_0/L_0 + K_1 e^{\alpha_1 t} + K_2 e^{\alpha_2 t} + K_3 e^{\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.18}$$

$$p(t) = p_0/L_0 + K_1 e^{\alpha_1 t} \sin(\beta_1 t + K_2) + K_3 e^{\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.19}$$

$$p(t) = p_0/L_0 + K_1 e^{-\alpha_1 t} \sin(\beta_1 t + K_2) + K_3 e^{\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.20}$$

$$p(t) = p_0/L_0 + K_1 e^{-\alpha_1 t} \sin(\beta_1 t + K_2) + K_3 e^{-\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.21}$$

$$p(t) = p_0/L_0 + K_1 e^{\alpha_1 t} + K_2 e^{\alpha_2 t} + K_3 e^{\alpha_3 t} + K_4 e^{-\alpha_4 t} \tag{6.22}$$

$$p(t) = p_0/L_0 + K_1 e^{\alpha_1 t} + K_2 e^{\alpha_2 t} + K_3 e^{-\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.23}$$

$$p(t) = p_0/L_0 + K_1 e^{\alpha_1 t} + K_2 e^{\alpha_2 t} + K_3 e^{\alpha_3 t} \sin(\beta_3 t + K_4) \tag{6.24}$$

$$p(t) = p_0/L_0 + K_1 e^{\alpha_1 t} + K_2 e^{\alpha_2 t} + K_3 e^{\alpha_3 t} + K_4 e^{\alpha_4 t} . \tag{6.25}$$

All forms are possible for $A < 0$, and all but (6.25) for $A > 0$.

It is worth adding that in the problem of monopoly a periodic solution can be obtained in the form

$$p(t) = p_0/L_0 + K_1 \sin(\beta_1 t + K_2) + K_3 \sin(\beta_3 t + K_4) , \tag{6.26}$$

when, and only when, $\delta = 0$, that is, when interest is neglected. Of course, curves of the types (6.19) and 6.20) may appear to the eye to be periodic when α_1 and α_2 are small, that is, when $\delta \neq 0$, although they are not actually so.

I could also suppose that the cost function $Q(u, u', p, p', t)$ contained a term $Ku(t)p(t)$ to include such items of cost as insurance of stocks on hand; certain forms of taxes and tariffs; and some forms of advertising such as the "penny sale," where two articles are sold for one cent more than the usual price of one. To include this in my work I need only replace γ by $\gamma_1 = \gamma - K$.

7. *The use of Fourier analysis for approximating time series.*— The theoretical price function (6.26) and the functions (6.19)–

(6.21) when a_1 and a_2 are small, lend decided weight to the arguments advanced for using a small number[18] of terms of Fourier series for representing price-time and production-time series. Other price functions suggest modification of this analysis by introducing exponential terms and factors. In the case of monopoly, there are only two terms involving sines. On the other hand, for a modified Cournot kind of competition[19] there may be one more sine term than the number of competitors.

8. *Determination of the constants of integration and discussion of solution.*—There are four constants of integration $K_1, \ldots, K_4$, in each type of price curve, and these same integration constants and no others appear in the corresponding production functions. If I impose only three end conditions, $u(t_1)-u_1=p(t_1)-p_1=t_1-\tau_1=0$, I will obtain only two equations involving these four constants. In this case the expression to be maximized, π, will be a function not only of the curves $u(t)$ and $p(t)$, that is, a functional of the calculus of variations,[20] but also a function of the end point t_2, $u(t_2)$, $p(t_2)$. I therefore have to maximize an expression π which is a function of a point as well as a functional or function of a curve. The additional necessary conditions, called "transversality conditions," are well known to mathematicians.[21]

For the problem here mentioned, there will be three transversality conditions. I will, therefore, have five equations to determine the four constants of integration and the time t_2. In this case, however, t_2 will occur as an exponential coefficient, and the constants of integration in general will not appear linearly. There will, therefore, in general be more than one solution. To determine which one actually maximizes π, further conditions, namely sufficiency conditions, are required. If, however, I fix t_2, the condition involving K_i to the second degree will be satisfied identi-

[18] Any function which has a continuous derivative of the second order can be represented by a Fourier series. See E. L. Ince, *Ordinary Differential Equations* (1927), p. 275.

[19] Roos, "A Mathematical Theory of Competition," *Amer. Jour. Math.*, XLVII (1925), 163–75; hereafter called "VI."

[20] Hadamard, *op. cit.*

[21] *Ibid.*

cally, and I will have four linear equations to determine the four constants of integration. For the problem under consideration these will usually have a unique solution.

In any actual economic problem the quantities $A, \ldots, H$, and δ will not be constant over long intervals of time, so that I must assume (t_1, t_2) to be short. During the year these coefficients may be considered to be constant due to cancellations already referred to in paragraph 4. Sooner or later economic influences beyond the control of the producer will cause one or more of them to change abruptly. Soon after a producer recognizes an appreciable change in any of these coefficients, he may be expected to abandon his old schedules of production and prices and start minimizing his net discounted profit over a new interval of time. An important economic inference which could be drawn is that this frequent choice of end values prevents prices from increasing or decreasing indefinitely as functions of the type (6.22) might suggest. Some economists might prefer to say that prices do not increase or decrease indefinitely because of the steadying influences of economic conditions beyond the control of the monopolist. This interpretation is only another way of looking at the one I have just proposed, since changes in outside economic influences will cause $A, \ldots, H, a, b, h$, and δ to change, and this may result in the monopolist abandoning his old schedules. My proposal has the advantage of being definite.

If I attempt to apply this price-time function to an interval only slightly greater than (t_1, t_2), I cannot even be sure that prices will follow the same type of curve, since any of the coefficients may change and cause the maximizing price function to take an entirely different form. I have already given a theory of business forecasting based on the results of this paper, and for that reason no further discussion of this important phase of the problem is necessary here.[22]

III. PROBLEMS INVOLVING COMPETITION OF PRODUCERS

9. *The phenomena of competition.*—One problem of competition of n producers of an identical commodity is that of determining

[22] Roos, IV.

the price $p(t)$ and the rates of production $u_k(t)$ satisfying a demand-supply equation

$$\sum_{i=1}^{n} u_i(t) = ap(t)+b+hp'(t) \tag{9.1}$$

and end conditions $t_{k1}-\tau_{k1}=p(t_{k1})-p_{k1}=u_k(t_{k1})-u_{k1}=0$, $(k=1, \ldots, n)$, so that the profit

$$\pi_k = \int_{t_{k1}}^{t_{k2}} [\gamma pu - A_k u_k^2 - B_k u - \cdots - H_k u'] E(t_1, t)\, dt$$

of each of the respective producers is a maximum when the rate of production $u_k(t)$ alone is allowed to vary with $p(t)$, that is, in maximizing π_k I will vary only u_k and p.[23] A simpler problem more susceptible to analysis is the one for which $A_k=A$, $D_k=D$, $t_{ki}=t_i$, $(k=1, \ldots, n;\ i=1, 2)$. For this problem, I obtain

$$L_4 d^4p/dt^4 + L_3 d^3p/dt^3 + L_2 d^2p/dt^2 + L_1 dp/dt + L_0 p - p_0 = 0\,,$$

where here

$$\left.\begin{aligned} L_4 &= -2h^2D\,,\\ L_3 &= 4h^2D\delta\,,\\ L_2 &= 2Ah^2 + 2ahD\delta - 2Dh^2\delta^2 + 2a^2D + 2\Sigma F_k\,,\\ L_1 &= -2\delta[Ah^2 + aD(a+h\delta) + \Sigma F_k] + \gamma h(1-n)\,,\\ L_0 &= 2a[(\gamma+n\gamma)/2 - Aa] + h\delta(n\gamma - 2Aa)\,,\\ p_0 &= (a+h\delta)[\Sigma(B_k+H_k\delta)] + \Sigma G_k\delta + b[\gamma - 2A(a+h\delta)]\,. \end{aligned}\right\} \tag{9.2}$$

For n small and $\delta \neq 0$ the inequalities (6.13) still hold, so that the solutions are of the forms already obtained (6.14), ... , (6.26). For n large it can be shown that the price function will be confined to the types (6.17), ... , (6.20), (6.25).

For the more general case where no restrictions of the foregoing type are made on A_k and D_k and γ, I may reduce the system of

[23] Roos, VI. See also my paper, "Generalized Lagrange Problems in the Calculus of Variations," *Trans. Amer. Math. Soc.*, XXX (1928), 360–84; hereafter called "VII."

differential equations consisting of the Euler-Lagrange equation and the differential equation of demand-supply to a linear system. The general solution will take the form

$$p(t) = p_0 + \sum_{i=1}^{2n+2} C_i f_i e^{r_i t} \tag{9.3}$$

$$u_k(t) = f_{k0} + \sum_{i=1}^{2n+2} C_i f_{ki} e^{r_i t} \qquad (k = 1, \ldots, n)$$

where p_0, f_i, and f_{ki} are constants which depend upon the statistical constants $A_k, \ldots, H_k$, a, b, h, and δ, and the C_i are constants of integration (which in an actual problem are to be determined by $2n+2$ end and transversality conditions), and the r_i are roots of the characteristic equation of the system.[24]

It would be folly to maintain that a producer obtains a maximum profit. The curve which gives a maximum profit is the ideal sought by a cut-and-try method and only approximated in a rough sort of way. One might suppose that the points representing a producer's solution will lie on either side of the theoretical price curve; not necessarily alternately on one side or the other. It would follow as a corollary that intelligent producers could come nearer to the correct solution than those not so endowed by nature.

The fact that I have used only one price, $p(t)$, does not mean that I have assumed Jevons' law of indifference.[25] I assume that there is only one theoretical price in a particular market which will produce a maximum profit to each of the several producers in the sense already stated, but again maintain that the theoretical ideal need not in general be maintained. All prices for an identical commodity in the same market (that is, one so compact that the cost of transportation is negligible) should approximate the theoretical price. If the number of competitors is large, this theoretical price may be assumed to be an arithmetic average of the individual prices.

[24] Goursat, *op. cit.*, II, 491 and 485.

[25] Jevons, *Principles of Economics* (London, 1905), pp. 59–60.

Some economists appear to believe that if one competitor reduces his price below that of all others in the same market, all customers will flock to him and he will be able to obtain a larger profit. We know from experience that this is not the case.[26] It seems better to hold that customers compare the price of any competitor with an average price for the market, and, if the difference is sufficiently small, make the purchase without further investigation. If all prices in the same market should remain constant, it might be reasonable to suppose that after a time all customers would go to the producer who maintained the lowest price; but when prices change, as we know they do, the producer who has the high price today may have the low price of tomorrow. And how can the customer tell which situation prevails at any particular time without making an extensive and costly investigation? They therefore make their comparison; and, if the price is below the average which they happen to use, they may purchase several units; whereas if it is above, they may supply only their immediate needs.

As another possibility, we may assume so-called "free competition." In this case each competitor supposes that his production is so small compared with the total that it has a negligible influence on $p(t)$. Mathematically this means that $p(t)$ is held constant in each π_k so that the conditions for a solution become

$$\frac{\partial\left(\gamma p u_k - Q(u_k, u_k', p, p', t)\right)}{\partial u_k} = \frac{d}{dt}\left[\frac{\partial\left(\gamma p u_k - Q(u_k, u_k', p, p', t)\right)}{\partial u_k'}\right] \qquad (k = 1, \ldots, n), \quad (9.4)$$

plus the demand-supply equation. For the demand and cost of production functions already assumed, these equations give a system of second-order differential equations with constant co-

[26] H. Hotelling, in his paper "Stability in Competition," *Econ. Jour.*, 1929, pp. 41–57, gives references to papers on this subject and develops an interesting theory of equilibrium based on transportation charges. My paper "A Dynamical Theory of Economics," *loc. cit.*, 1927, includes much of Hotelling's paper as a special case since Hotelling's cost of transportation is simply one of my prices $p_2, \ldots, p_{n+1}$ when one realizes that an identical commodity is not an identical commodity plus the service of transportation of the commodity.

efficients. The general solution will therefore again be given in terms of exponentials and sines. In particular, if $A_k = A$ and $D_k = D$, the price $p(t)$ will be given in terms of three exponentials, so that at most two complex roots are possible and therefore only one sine term of the form considered in this paper.

For this kind of competition it is interesting to consider the special case $\gamma = 1$, $D = F = H = G = 0$, that is, the case for which the rate of production is equal to the rate of demand and the cost of production function does not depend upon the price $p(t)$ and the derivatives $u'(t)$ and $p'(t)$. For this case the equations (9.4) become

$$p = 2A_k u(t) + B_k \qquad (k = 1, \ldots, n),$$

that is, at the time t, each enterpriser produces an amount which makes his marginal cost $dQ_k/du = 2A_k u(t) + B_k$ equal to the market price at that time.

If I substituted a cubic equation in place of my quadratic cost function $A_k u^2(t) + B_k u(t) + C_k$, I would, of course, not in general get the solutions (6.9) – (6.26); but a producer during a year is not concerned with the entire cost curve, and a small portion of it can always be represented by a parabola to a high degree of accuracy.

As a further possibility, I might assume a condition of co-operation, that is, that the n producers of a like commodity will determine their rates of production $u_k(t)$ and the price $p(t)$ satisfying (9.1) and certain end conditions so that the combined discounted profit

$$\pi = \int_{t_0}^{t_1} \left[\sum_{i=1}^{n} \gamma p u_i - A_i u_i^2 - \cdots - H_i u_i \right] E(t_1, t)\, dt$$

will be a maximum. This is a strict Lagrange problem in the calculus of variations.

For the case $A_k = A$ and $D_k = D$, one will obtain

$$L_4 d^4p/dt^4 + L_3 d^3p/dt^3 + L_2 d^2p/dt^2 + L_1 dp/dt + L_0 p - p_0 = 0,$$

where

$$L_4 = -2Dh^2/n$$
$$L_3 = 4Dh^2\delta/n$$
$$L_2 = 2(Ah^2 + ahD\delta - Dh^2\delta^2 + a^2D + \Sigma nF_k)/n$$
$$L_1 = (-2\delta[Ah^2 + aD(a+h\delta) + \Sigma nF_k] + \gamma h(n-1))/n$$
$$L_0 = [2a(n\gamma - Aa) + h\delta(n\gamma - 2Aa)]/n$$
$$p_0 = [\Sigma nG_k + \Sigma(a+h\delta)(B_k + H_k\delta)n + b(n\gamma - 2A(a+h\delta)]/n.$$

The solutions will again be of the general types (6.17), ... , (6.26).

10. *Profit and loss.*—The fact that I have obtained solutions which produce a maximum profit does not mean that a producer will actually receive a profit. A particular producer may find that he cannot operate at a profit at all, that is, that the best that he can do is to minimize his losses. If I assume that a competitor will go out of business rather than suffer a loss for a whole period of time, I must have $\gamma p u_k - Q(u_k, u_k', p, p', t) > 0$. If I substitute our price and production functions in this inequality, I can regard the resulting inequality as an inequality to determine the maximum number of competitors who can operate according to cost functions assumed in this paper and make a profit. Again, when the ratio of π_k to the total sum invested by the kth producer exceeds the rate of interest plus a risk factor for the industry, I may expect additional producers to enter the field.

IV. A SIMPLE THEORY OF BUSINESS CYCLES AND CRISES

11. *A quantitative theory of price and production fluctuations.*—I am now in a position to describe economic phenomena and account for steady prices, rise and fall of prices, slight fluctuations, violent fluctuations, and crises. As already agreed, what I say about prices will apply *in toto* to rates of production.

For the sake of conciseness, I begin with the price function (6.14) and follow with the functions in the order in which they are named in this paper, understanding, of course, that this is a hypothetical situation but that my arguments can be permuted in the sense that the price functions can be, and hence that my theory

is general. Although relative maxima and minima are possible for all functions (6.14), ... , (6.25), I am going to simplify matters by assuming that the end conditions are chosen so that all functions which do not involve sines are monotonically increasing or decreasing. All K_i and C_i are assumed >0.

According to (6.14), the price of C will increase from the initial price $p(t_1)$. This increase will continue until δ (interest rate) or some of the demand or cost of production coefficients change an appreciable amount. A different price function will then result, and I may suppose it to be (6.15). For a short time the price may decrease, oscillating slightly about a decreasing trend; but as time passes, the oscillations will increase in magnitude until another change in economic conditions occurs. If (6.16) is the new function, the price will continue to oscillate about a decreasing trend; but as time passes, these oscillations will die down and the price approach the steady price p_0/L_0. This may result in a state of almost guaranteed profits at any particular time; and speculation, with attendant overproduction, may result. After the resultant changes in n and γ are made, the new price function may be (6.17). Oscillations of diminishing amplitude about an increasing trend price will be the result until another adjustment occurs.[27] If (6.18) is the new price function, the price will oscillate with increasing amplitude about an increasing trend price. In the case of (6.19) the price will oscillate about an oscillating trend price. The reader should now be able to analyze the remaining cases. In particular, the end conditions may be chosen so that all constants K_i are zero. This will be the case for the problem of monopoly if $p(t_1)=p(t_2)=p_0/L_0$ and $u(t_1)=u(t_2)=ap_0/L_0+b$.

One might naturally ask whether the statistical coefficients A, B, ... , H, G, of the cost of production function, which depend upon the prices of other commodities and services, do not also vary according to similar laws; and, if, as a result, it is not inconsistent to assume them to be constant over any period of time. The answer is *no*. In the first place, the production coefficients A, B, ... , H, G, usually depend upon several such prices, and it may easily happen that the effect due to a change in

[27] Our choice of order seems somewhat unreal in this instance.

one price will be canceled by an opposite movement in another. I do not mean to imply, however, that this cancellation always occurs, nor that in general it is complete. It is more probable that they do change very often over a period of time (t_1, t_2), but that the changes are so small that producers neglect them. In the second place, there are certain industries which contract for materials and which operate on a wage scale that remains fixed by agreement. It is not proposed that the reasons offered here are the only ones, and it is hoped that the reader will be able to supply others.

12. *Business cycles and crises.*—Just as the coefficients of the cost function can remain nearly constant while the various prices determining them are changing, so the supply of money or credit in an economic system can remain adequate to meet the needs of the system due to cancellation of price movements. Thus, at a time that commodity A is rising in price, commodity or service B may be falling. As long as this cancellation is nearly complete, interest rates may be expected to be stationary; but when price increases as a whole seriously overbalance price decreases, monetary trouble may be expected. If an adjustment in interest rates is made soon enough, a crisis may be averted, since new profit intervals and new price functions will result. If additional money is obtained by credit expansion so that γ is decreased, i.e., overproduction occurs, a day of reckoning may be expected.

Sometimes credit expansion becomes top-heavy. Prices and production rates increase until the unsoundness of the situation becomes apparent. Prices tumble, production is curtailed, and a crisis results. Producers become panicky and forget all about profit over an interval of time. Immediate cash becomes their aim. Liquidations follow, and as a result prices tumble still further until business confidence returns and normal trade movements begin again.

13. *Relation of my theory of crises to existing theories.*—I propose now to show how existing theories of business cycles and crises dovetail into the theory outlined in the preceding section and the rest of this paper. I do not accept all or any one of the theories cited, nor do I commend some of the writers for the undue emphasis which they place upon the particular phase of the

problem which they advocate. On the contrary, I will support W. C. Mitchell in his contention that there is no such thing as a prime-mover in producing cyclical oscillations.[28]

In December, 1923, Professor Irving Fisher wrote, "The principal force affecting the cycle is the real rate of interest, the sum of the money rate of interest and the rate of appreciation (positive or negative) of the purchasing power of the dollar."[29] In June, 1925, he said that trade fluctuations are due primarily to "price change," and added that the next most important influence is probably that of the rate of interest.[30] It is by introducing the rate of change of price into the demand equation that the problems of monopoly, etc., become problems in the calculus of variations, and it is upon this branch of mathematics that my whole theory rests. I have already pointed out that a change in interest rate is sufficient to change a theoretical price function from an exponential to a periodic form.

W. C. Mitchell has written, "Since the quest of money profits by business enterprises is the controlling factor among the economic activities of men who live in a money economy, the whole discussion must center about the prospects of profit."[31] To obtain my theoretical price functions, I have assumed that a producer will vary his price and rate of production, satisfying a demand equation, so that his discounted net profit will be a maximum. My hypothesis also assigns a definite place to L. K. Frank's theory that the variation of production rates influences the formation of cycles.[32]

H. B. Hastings attributes business cycles to "dealer buying to keep stocks commensurate with sales, forward buying and speculation."[33] By changing γ, the ratio of production to consumption, I can permute my price functions among themselves.

[28] W. C. Mitchell, *op. cit.*, p. 11.

[29] Irving Fisher, *op. cit.*, p. 1024.

[30] Irving Fisher, "Our Unstable Dollar and the So-called Business Cycle," *Jour. Amer. Stat. Assoc.*, XX (1925), 191–98.

[31] W. C. Mitchell, *Business Cycles* (University of California, Berkeley, 1913), p. 450.

[32] L. K. Frank, "A Theory of Business Cycles," *Quar. Jour. Econ.*, 1923, p. 628.

[33] H. B. Hastings, *Costs and Profits* (Boston, 1923), pp. ix–x.

Influences outside of the realm of economics, such as sun-spots or rainfall, conceivably may at any time cause the statistical constants $A, \ldots, h, \delta$, to change in such a way that price cancellations are disrupted. In this sense my theory also agrees in part with the theories of H. L. Moore[34] and W. S. Jevons.[35]

Finally, let me say that I have not attempted to show how all theories of crises fit into the general picture given in this paper. I have merely considered a few typical and important theories in order to show some of the powerful economic implications of the mathematical theory as developed here. Neither have I attempted to give recognition to all contributors to the theories, since such an extensive bibliography would be beyond the scope of a paper of this type.[36] It is hoped, however, that the reader who is interested in this phase of economics will be able to use the hints given here to fit other theories into the picture.

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[34] H. L. Moore, "The Origin of the Eight-Year Generating Cycle," *Quar. Jour. Econ.*, XXXVI (1922), 1.

[35] W. S. Jevons, *Investigations in Currency and Finance* (1884), p. 215.

[36] For a summary and classification of a number of theories, see W. C. Mitchell, *op. cit.* (1927), pp. 11–60.

A CULTURE THEORY OF POPULATION TRENDS

ATTEMPTS to supply a theory of population growth or decline have been based largely on biological and economic premises. The formulas advanced are usually reducible to the dichotomy, physiological organism and food. Births and deaths are obviously biological facts, and their ratio determines the increase or decrease of population. But this commonplace is no indication that a particular rate of population growth is specifically controlled by biological mechanisms. Though food sets limits to possible growth, the theoretical possibility does not explain the actual trends. A review of existing theories leads necessarily to the rejection of assumptions based exclusively on biological and economic interpretations, and compels the substitution of a cultural interpretation of various population phenomena.

The biological determinism implied by Malthus and other early students of the population question has been made more explicit by later writers. An outstanding recent example is found in the mathematical formulas of Pearl and Reed. Assuming that the statistical aggregate of a population is the resultant of the physiologically fixed reproductive capacity and the organism's need of nutrition, these investigators have deduced what they venture to call "universal laws" of population growth. According to their formulas the rate of growth is a function of the size of the population already attained, and the amount of the unutilized subsistence or resources still available at a given date, in the supporting area.[1] An initial slow rate of absolute growth is supposed to be followed by an acceleration, and this by a subsequent retardation.

Corroboration for their so-called laws of human population growth, these authors think, is found in analogies of increase in the number of fruit flies, the rate of growth of yeast, pumpkins, and tadpole tails, and the egg-laying performance of hens. Un-

[1] Raymond Pearl, *The Biology of Death* (Philadelphia, 1922), pp. 247–48.

derlying these analogies is the assumption that the reproductive potentiality in a human population, as in aggregates of insects, is released or limited solely by environmental physical factors such as temperature, light, nutrition, air, and humidity. The mechanisms of growth are inferred to be the same in all cases, whether the increase be that of size or of number of organisms. "Population growth, in respect of its rate," Pearl affirms, "appears to be a fundamental biological phenomenon in which insects and men behave in a similar manner."[2] This approach attempts to reduce humanistic phenomena to "naturalistic" or physical terms.

Such "laws" are invalidated by the methods used in their construction. The logistic curves have no explanatory value and, in their universalized form, contain logical inadequacies. The affirmation of a conceptual similarity between such widely different subjects sheds no light on any one of them. Willcox has said,

> I see no convincing reason to believe in regular curves of growth susceptible of representation by mathematical equations, through the help of which it is possible to foresee the future growth of populations. . . . . My skepticism goes deeper. I do not believe in the existence of any simple law of population growth.[3]

Wolfe concludes,

> One fallacy in any such analogy lies in the fact that any phenomenal change that takes place at a decreasing rate in time can be represented by a logarithmic curve. Even for the analogy between growth of an individual organism and growth of an aggregate, it is, to the present writer, impossible to see any rational warrant in a study of the population problem.[4]

Similar vague mechanical or "natural" connections between nutrition and population growth are implied or affirmed by other writers. One of these asserts: "Population pressure is to some extent analogous to pressure of gas or vapour in physics."[5] Sir

[2] Raymond Pearl, "Some Eugenic Aspects of the Problem of Population," *Eugenics in Race and State—Papers of the Second International Congress of Eugenics* (Baltimore, 1923), II, 213.

[3] W. F. Willcox, "Population and the World War," *Journal of the American Statistical Association*, XVIII, No. 142 (1923), 710–11.

[4] A. B. Wolfe, "Is There a Biological Law of Human Population?" *Quarterly Journal of Economics*, XLI (1926–27), 585.

[5] J. Swinburne, *Population and the Social Problem* (New York, 1924), p. 58.

James Steuart in his *Inquiry into the Principles of Political Economy* (1767) said:

> The generative faculty resembles a spring loaded with a weight, which always exerts itself in proportion to the diminution of resistance. When food has remained some time without augmentation or diminution, generation will carry numbers as high as possible; if, then, food comes to be diminished, the spring is overpowered, the force of it becomes less than nothing, inhabitants will diminish. . . . .[6]

Roscher states:

> A basin entirely filled with water can be made to contain more only in case it is either increased itself, or a means is found to compress its contents. Otherwise as much must flow out on one side as is poured in on the other. And so, everything else remaining stationary, the fruitfulness of marriages must, at least in the long run, be in the inverse ratio of their frequency.[7]

Woodruff supposes that "the saturation point for population closely corresponds to the mean annual rainfall. That is, the more rain there is, the more grass and grain, and therefore more flocks and herds for man to eat."[8] This statement ignores the fact that some areas of great rainfall have sparse populations. Equally untenable are the beliefs that variation in fertility is associated with altitude and Sadler's theory that fecundity stands in direct ratio to the fertility of the soil.[9] More guarded is his theory that the children per family become less as the population becomes more numerous, and Verlust's argument that

> if a population is expanding freely over unoccupied territory, the percentage rate of increase is constant. If it is growing in a limited area, the percentage rate of increase must tend to get less and less as the population grows, so that the percentage rate of increase is some function of the population itself, which falls continuously as the numbers of the population rise.[10]

Though some writers give recognition to the fact of control over the environment, their explanations still rest upon physio-

[6] Quoted by Frédéric Bastiat, *Harmonies of Political Economy* (Edinburgh, 1880), p. 402.

[7] William Roscher, *Principles of Economics* (New York, 1878), II, 276–77.

[8] C. E. Woodruff, *Expansion of Races* (New York, 1909), p. 21.

[9] Michael T. Sadler, *The Law of Population* (London, 1830).

[10] A summary of Verlust's three memoirs (1838, 1845, 1847) on this subject is given by G. U. Yule, "The Growth of Population and the Factors Which Control It," *Journal of the Royal Statistical Society*, LXXXVIII (1925), 4.

logical premises. The theories upheld by Achille Loria, Levasseur, Sumner, Keller, and others were of this character. In 1854 G. K. Rickards spoke of "the true law of population as a self-regulating power, capable of adjusting itself to the most opposite phases of society, and, in the absence of disturbing causes, proportioning the supply to the demand, under all the infinitely varying circumstances of human nature."[11] Bastiat believed that population has a tendency to proportion itself to the means of subsistence, and that these means increase with the growth of population. Holmes observes that "increased means of production may, for a while, keep pace with the growing numbers of inhabitants. But in time the growth of population must bring about its own checks."[12] This writer, like Malthus, sees population growth as a calamity, while others, including Darwin, regard it as a source of "progress." Woodruff believes that social progress depends upon food supply, since the pressure of population upon subsistence stimulates invention and control over nature.[13] This theory is a variation of Keller's formula which holds that inventions and numbers are functions of each other.[14] From this point of view, the simple equation, "food and population," offers the solution of the enigma of progress.[15]

While such theories are corroborated by some facts, they are invalidated by others. The inadequacy of population theories which rest on the organism-food, or on any other exclusively "naturalistic" premise is indicated by the fact that in some sections where the per capita quantity of goods and the general physical well-being have increased the birth-rate has declined.[16]

[11] George K. Rickards, *Population and Capital* (London, 1854), Preface, p. xii.

[12] Samuel J. Holmes, *Trend of the Race* (New York, 1921), p. 122.

[13] Charles E. Woodruff, *op. cit.*

[14] William G. Sumner and A. G. Keller, *The Science of Society* (New Haven, 1927), I, 72.

[15] R. Mukerjee, *Regional Sociology* (New York, 1926), pp. 109–10.

[16] A. M. Carr-Saunders, *The Population Problem* (Oxford, 1922), pp. 285–86; F. S. Nitti, *Population and the Social System* (London, 1894), pp. 92–109; A. Niceforo, "Development of the Population in Italy," *Proceedings of the World Population Conference, 1927* (London, 1927), pp. 65–70; J. Bourdon, "Is the Increase in the Population a Real Danger for the Food Supply of the World?" *ibid.*, p. 111; George K. Rickards, *op. cit.*, pp. 62–67, 118–25; Sir William Beveridge, "Mr.

This decline, which has been obvious for more than half a century in the most prosperous nations, has recently been accelerated, as shown by Kuczynski's study of Northwest Europe and by the unprecedented low rates in the United States during the last few years.[17]

The organism-food dichotomy is also invalidated by the fact that in the Western nations the families of wealthy people are at present generally smaller than are those of the poor. This differential birth-rate was evident in Roman times, as shown by the designation applied to the working people, *proletarii* ("bearers of children"), and by the rapid extinction of many patrician families. The same demographic phenomenon was noted by Adam Smith and Malthus, and has since been shown to hold in so many countries and cities that the fact has become a commonplace.[18]

Keynes' Evidence for Overpopulation," *Economica*, IV (1924), 17 ff.; James Caird, "General View of British Agriculture," *Journal of the Royal Agricultural Society of London*, XIV, Part II, 277–332; Andrew Carnegie, *The Gospel of Wealth* (New York, 1901), pp. 48–52; Helen Bosanquet, *The Standard of Life* (London, 1900), pp. 340–71.

[17] R. R. Kuczynski, *The Balance of Births and Deaths* (New York, 1928), p. 140; British Commission of Inquiry into the Declining Birth Rate, *The Declining Birth Rate* (New York, 1920), pp. 1–37; W. S. Thompson, "Population," *American Journal of Sociology*, XXXIV (July, 1928), 3–15, and XXXIV (May, 1929), 959–75; Arthur Newsholme and T. H. C. Stevenson, "The Decline of Human Fertility in the United Kingdom and Other Countries as Shown by the Corrected Birth Rate," *Journal of the Royal Statistical Society*, LXIX (1906), 34–87; W. S. Thompson, "Population Facts for the United States and Their Interpretation," *Journal of the American Statistical Association*, XVIII (March, 1923), 575–87; William Rossiter, "An Adventure of Population Growth," *ibid.*, 561–74; P. K. Whelpton, "Population in the United States (1925–75)," *American Journal of Sociology*, XXXIV (September, 1928), 253–70; E. Sydenstricker, "Population Statistics of Foreign Countries," *Journal of the American Statistical Association*, XX (March, 1925), 80–89; L. I. Dublin and Alfred J. Lotka, "On the True Rate of Natural Increase," *Journal of the American Statistical Association*, XX (September, 1925), 305–39; G. U. Yule, *The Fall of the Birth Rate* (Cambridge, 1920); Edward L. Thorndike, "The Decrease in the Size of American Families," *Popular Science Monthly*, LXII (1903), 64–70; Ray E. Baber and E. A. Ross, *Changes in the Size of American Families in One Generation* (Madison, 1924).

[18] Cf. Stewart Johnson, "The Relation between Large Families, Poverty, Irregularity of Earnings and Crowding," *Journal of the Royal Statistical Society*, LXXV (1912), 539–50; T. H. C. Stevenson, "The Fertility of Various Social Classes in England and Wales, from the Middle of the Nineteenth Century to 1911," *ibid.*, LXXXIII (1920), 401–32; *Report of the British Commission of In-*

Alison (1840) and Thomas Doubleday (1841) observed that the birth-rate stood in inverse ratio to the standard of living.[19] Darwin mentioned the fact that 19 per cent of the English nobility were childless, and that this percentage was three times the average for the whole nation. Investigations such as those made by Quetelet in Brussels, Farr and Heron in London,[20] Nitti in Naples,[21] and Bertillon in Paris, Berlin, Vienna, and London,[22] Hindelang in Bavaria, and Schwabe in Berlin,[23] Dunlop in Scotland,[24] and many other students with reference to various times and places[25] have shown the differences in the birth-rate of the

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quiry on the Declining Birth Rate (1920), pp. 8–12; E. M. Elderton, "Report on the English Birth Rate," *Eugenic Laboratory Memoirs* (London, 1914), Nos. 19, 20, Part I; W. F. Willcox, "Differential Fecundity," *Journal of Heredity*, V (1914), 141–48; Lucien March, "The Fertility of Marriage According to Profession and Social Position," *Problems in Eugenics—Papers of the First International Eugenics Congress* (London, 1912–13), I, 20–22.

[19] "By a singular anomaly, the rapidity of increase is in the inverse ratio of the means which are afforded of maintaining a family in comfort and independence. It is greatest when these means are the least and least where they are the greatest." —Archibald Alison, *The Principles of Population* (Edinburgh, 1840), I, 112. See also Thomas Doubleday, *The True Law of Population* (London, 1841), *passim*.

[20] David Heron, "On The Relation of Fertility in Man to Social Status," *Drapers Company Research Memoirs*, No. 1 (London, 1906).

[21] F. S. Nitti, *Population and the Social System* (1894), pp. 156–58; "Agricultural Contacts in South Italy," *Economic Review*, III (July, 1893), 376–77.

[22] J. Bertillon, *La Dépopulation de la France; ses consequences ses causes, mesures à prendre pour la combattre* (Paris, 1911).

[23] *Report of the British Commission of Inquiry on the Declining Birth Rate* (1920), p. 31.

[24] James C. Dunlop, "The Fertility of Marriage in Scotland: A Census Study," *Journal Royal Statistical Society*, LXXVII (1914), 260–88, 313–16; LXXVIII (1915), 35–40.

[25] W. S. Thompson, "The Size of Families from Which College Students Come," *Journal of the American Statistical Association*, XX (1925), 481–95; Hornell Hart, *Differential Fecundity in Iowa* (Iowa City, 1922), p. 39; "Occupational Differential Fecundity," *Scientific Monthly*, XIX (1924), 527–32; "Familial Differential Fecundity," *Journal of the American Statistical Association*, XX (March, 1925), 25–30; P. K. Whelpton, "Differentials in True Natural Increase," *ibid.*, XXIV (September, 1929), 233–49; A. M. Carr-Saunders, "Differential Fertility," *Proceedings of the World Population Conference* (London, 1927), pp. 130–43; Lucien March, "Differential Increase in the Population in France and in the World," *ibid.*, pp. 143–49; Corrado Gini, *ibid.*, pp. 157–69; A. Grotjahn, "Differential Birth Rate in

social classes. Gillette observes that a low birth-rate is associated with affluence, high rating of the educational system, and high frequency of notables in the population.[26] English statisticians have often noted the high birth-rate peculiar to mining and industrial districts. In Germany, the largest proportion of births to women of childbearing age was found in the industrial cities of the Rhine-Westphalian districts, while the lowest rate was found in the commercial cities, where there has been the greater wealth and comfort. Some attempts have also been made to prove that the number of children tends to decrease in proportion to the accumulation of property.[27]

The attempt to account for these variable birth-rates has led to a variety of theories, some of which rest on false methodological premises, since they suppose the phenomena to be physiological rather than cultural in nature. For example, Newsholme and Stevenson hesitatingly say: "It is not unlikely that up to a certain point improvement in prosperity favors fertility, though beyond this it may act to a limited extent in the opposite direction."[28] Pearl, when faced by inconsiderate facts, is forced to expostulate:

> It is the very harshness and inadequacy of the human environment which is the inevitable and indeed necessary concomitant of real poverty, which tends both directly and indirectly through psychological reactions to produce a high birth rate. And, on the other hand, it seems to me to be equally clear that the probably superoptimal environment, biologically speaking, which even moderate wealth is able to command, tends both directly and indirectly to low fertility and even a good deal of actual sterility.[29]

Germany," *ibid.*, pp. 149–57; H. W. Methorst, "Results of Differential Birth Rate in the Netherlands," *ibid.*, pp. 169–205; Karl Pearson, "On the Correlation of Fertility with Social Value," *Francis Galton Eugenics Laboratory Memoirs*, XVIII (London, 1910), 72.

[26] J. M. Gillette, "Community Concepts," *Journal of Social Forces*, September, 1926, p. 677.

[27] *Report of the British Commission of Inquiry on the Declining Birth Rate* (1920), pp. 41–42; Leonard Darwin, "Eugenics in Relation to Economics and Statistics," *Journal of the Royal Statistical Association*, LXXXII (1919), 5.

[28] Arthur Newsholme and T. H. C. Stevenson, "Human Fertility as Shown by the Corrected Birth Rate," *ibid.*, LXIX, 63.

[29] Raymond Pearl, "The Differential Birth Rate," in *Problems of Overpopulation*, edited by Margaret Sanger (New York, 1926), p. 23.

Doubleday, in a similar dilemma, argued that when the existence of a species is endangered, "A corresponding effort is invariably made by Nature for its preservation and continuance by an increase of fertility, and that this especially takes place whenever such danger arises from a diminution of proper nourishment or food."[80] Spencer advanced the theory that the power of multiplication diminishes as differentiation of function and complexity of the organism increase.[81] Similar views were expressed by De Candolle, Jacoby, Delaunay,[82] and more recently by F. Carli.[83] From the data at hand Fourier deduced the principle that "just in proportion as individuals or a community become perfected in civilization, in the same proportion the race inclines to run out."[84] A. K. Chalmers[85] and Corrado Gini[86] likewise stress the physiological factors underlying the declining birth-rates.

Others have shared this belief in a naturalistic population theory with equal disregard of supporting data. Pell declared variations in animal fertility to be in inverse ratio to the development of nervous energy.[87] Brownell found a relation between a low birth-rate and the incidence of nervous diseases.[88] Dr. Brownlee maintained that increases in population were due to rhythmic variations in germinal vitality, similar to those resulting in re-

[80] Thomas Doubleday, *op. cit.*, pp. 5, 6.

[81] Herbert Spencer, "A Theory of Population Deduced from the General Law of Animal Fertility," *Westminster Review*, LVII (April, 1852), 468–502; *The Principles of Biology* (New York, 1875), II, 446–508.

[82] F. S. Nitti, *op. cit.*, pp. 75–76.

[83] F. Carli, *L'Equilibrio delle nazióni* (Bologna, 1920), pp. 177 ff., quoted by P. Sorokin, *Contemporary Sociological Theories* (New York, 1928), p. 551, footnote 69.

[84] Quoted by Nathan Allen, *Population: Its Law of Increase* (Lowell, Mass., 1870), p. 23.

[85] A. K. Chalmers, "Testimony before the British Commission of Inquiry on the Declining Birth Rate," in *Report* (1920), pp. 24–25, 336–39.

[86] C. Gini, "Considerations on the Optimum Density of a Population," *Proceedings of the World Population Conference* (London, 1927), pp. 118–28; "Decline in the Birth Rate and the Fecundability of Women," *Eugenics Review*, XVII (1925–26), 73–77; 258–74.

[87] Charles E. Pell, *The Law of Births and Deaths* (London, 1921), p. 190.

[88] J. L. Brownell, "The Significance of a Decreasing Birth Rate," *Annals of the American Academy of Political and Social Science*, V (1894–95), 65.

markable literary output, "racial adventure," plagues of field mice or locusts.[39] Bluhm attributed the lessening fertility of the Germans to racial deterioration,[40] and Jules Simon accounted for the slow growth of the French people in a similar way.[41] Dr. Cyrus M. Edson and Dr. Billings hold like views with reference to the lower birth-rate in the United States.[42] Hansen thought he discovered a correlation between the declining birth-rate and the inferiority of the first-born.[43]

However, available data fail to show that the lowering birth-rate is due to changes in fecundity, that is, in physiological capacity of reproduction. The intensive investigations made by the English Birth Rate Commission, and by Ethel Elderton show no evidence of a reduction in fecundity. Dudfield likewise concludes:

> There is no direct evidence, statistical or medical, in favor of any suggestion that any decrease has taken place in the potential fecundity or fertility of the human race in general or the English race in particular. . . . . There is no data for arriving at any measure of the loss of fertility resulting from late marriages.[44]

Darwin and others believed that the powers of reproduction have increased, rather than diminished.[45] Some investigators have stated that modern civilized races do not differ in fecundity.

[39] See the following statements by John Brownlee: "Testimony before the British Commission of Inquiry on the Declining Birth Rate," in *Report* (1920), pp. 149 ff.; discussion on T. H. C. Stevenson's paper, "The Laws Governing Population," before the Royal Statistical Society, December 16, 1924, *Journal of the Royal Statistical Society*, LXXXVIII (1925), 82, 83; "Germinal Vitality," *Proceedings of the Royal Philosophical Society*, Glasgow, April 29, 1908.

[40] Agnes Bluhm, "Zur Frage nach der generativen Tüchtigkeit der deutschen Frauen und der rassenhygienischen Bedeutung der ärztlichen Geburtshilfe," *Archiv für Rassen- und Gesellschafts-Biologie*, IX (July–August, 1912), 454–74.

[41] M. Jules Simon, "L'Ouvrier de huit ans," reviewed in *Journal of the Royal Statistical Society*, XXX (1867), Part II, 343–45.

[42] Cyrus M. Edson, "American Life and Physical Deterioration," *North American Review*, CLVII (1893), 440–51; John S. Billings, "The Diminishing Birth Rate in the United States," *Forum*, XV (June, 1893), 467–77.

[43] Sören Hansen, "Über die Minderwertigkeit der erstgeborenen Kinder," *Archiv für Rassen- und Gesellschafts-Biologie*, X (Copenhagen, 1913), 701–22.

[44] Reginald Dudfield, "Some Unconsidered Facts Affecting the Birth Rate," *Journal of the Royal Statistical Society*, LXXI, 15.

[45] A. M. Carr-Saunders, *op. cit.*, pp. 100–110.

That the variable rate of increase is not due primarily to biological variations is shown by the fact that the birth-rate of some so-called races varies from place to place, and conforms to that of the population among which they are located.[46]

A physiological explanation of the declining birth-rate is also refuted by facts concerning the marriage rate and the age of marriage. All European countries and all American states, as Brentano points out, have shown a decline in the birth-rate since 1870 irrespective of an advance or decline in the marriage rate.[47] In France the birth-rate has steadily declined since the beginning of the nineteenth century, even when the marriage rate has increased, as it did between 1890 and 1907.[48] During the period when the birth-rate has decreased, the marriage rate has remained fairly constant throughout Europe[49] and has increased in the United States.[50] During the same time the average age of marriage has decreased in France, Prussia, Bavaria, Oldenburg, Finland, Würtemburg, and Saxony.[51] Likewise in the last half-century the age of marriage and also the percentage of single persons in the lower age groups and in the entire group fifteen years of age and over have diminished in the United States.[52]

[46] C. E. Pell, *op. cit.*, p. 19.

[47] L. Brentano, "The Doctrine of Malthus," *Economic Journal*, XX (September, 1910), 371–93.

[48] S. J. Holmes, *The Trend of the Race* (New York, 1921), p. 148.

[49] Arthur Newsholme, *The Elements of Vital Statistics* (New York, 1923), p. 67. Changes in the marriage rate, Thompson believes, are but temporary and local. —W. S. Thompson, *Population: A Study in Malthusianism* (New York, 1915), p. 96.

[50] Department of the Census, *Marriage and Divorce, 1927* (Washington: U.S. Government Printing Office, 1929), p. 5.

A recent study shows an increase of the marriage rate for the younger age groups.—R. S. Lynd and Helen M. Lynd, *Middletown* (New York, 1929), pp. 110–111.

[51] S. J. Holmes, *op. cit.*, p. 149.

[52] United States Department of Commerce, Bureau of the Census, Fourteenth Census, Vol. II, *Population* (1920), p. 387; William B. Bailey, "Some Recent Changes in the Composition of the Population of the United States," *Journal of the American Statistical Association*, XIII (1912–13), 390–91; E. R. Groves and William F. Ogburn, *American Marriage and Family Relationships* (New York, 1928), pp. 151–293.

The tendency shown by the upper classes in the last two generations to postpone marriage, although having some effect upon the birth-rate,[53] could not, Heron concluded, be responsible for more than 50 per cent of the decline.[54] Young men of the wage-earning class, according to Rubin, who made an intensive investigation of Danish marriages in the period covering the sixteenth to the nineteenth centuries, marry earlier today than formerly.[55] Neither the marriage rate nor the age of marriage, therefore, can be regarded as the cause of the diminishing birth-rate.[56]

Every purely "naturalistic" explanation advanced to account for the variable rate of population growth illustrates Huxley's definition of a tragedy—a theory refuted by a fact. Any adequate population theory must not only indicate some channel for the regulation of numbers, as these explanations attempt to do, but must also take into consideration the psychological and cultural factors which the purely biological explanations ignore. Many writers on this subject have admitted the influence of prudential considerations in reference to prospective pain, discomfort, or deprivations.

Among these writers, economists have been most concerned with the reaction of individuals to variable quantities of actual or prospective economic goods. Although the problem is held to be one of economic determinism, the mechanism is assumed to involve a psychological, rather than a chemical and physical, connecting medium between environment and numbers. Prudence, rather than physiological wants, is assumed to be the deciding factor. Adam Smith, Montesquieu, and Malthus supplied the model for much of the current discussion relative to this point. Recent opinions have been summarized by Thompson, who con-

[53] According to Dunlop, the calculated influence of one year of marriage is to raise the average by 0.29 of a child; in other words, by three children in ten years. —J. C. Dunlop, *op. cit.*; cf. C. E. Pell, *op. cit.*, p. 21.

[54] D. Heron, "On the Relation of Fertility to Social Status," *Draper's Company Research Memoirs*, No. 1 (1906), pp. 18–20.

[55] Marcus Rubin, "Population and the Birth Rate," *Journal of the Royal Statistical Society*, LXIII (1900), 600–609.

[56] *Report of the British Commission of Inquiry on the Declining Birth Rate* (1920), p. 37; cf. George C. Whipple, *Vital Statistics* (New York, 1923), 2d ed., pp. 249, 250; Arthur Newsholme, *op. cit.*, pp. 68–70.

cludes that it is not only actual pressure upon sustenance but also "fear of pressure in its manifold forms which keeps population from multiplying more rapidly than it does."[57]

These deductions have been reduced to various formulas. One writer says: "The number of births is in an inverse ratio, not to the density of population, but to the difficulty of providing for a family."[58] Holmes, after expressing the thought that there is no longer reason for fearing the scourges which formerly checked increase, declares: "It is now becoming probable that the automatic checks will not depend so much upon the increase of the death rate, as upon the decrease of the birth rate."[59] East, who apparently accepts the logistic curves of Pearl and Reed without reservation, nevertheless concedes that "there is no good reason for saying that the upper limits of food production will be reached because of population pressure," since (in true ethnocentric style) it is "to be assumed that Americans will have sufficient foresight to adjust the birth rate to the death rate."[60]

The declining birth-rate is believed by the German economist, Julius Wolf, to be the effect of "an increasing rationalism of life."[61] Sidney Webb, noting that the decline in the birth-rate was largest among the well-to-do classes, supposed that these were especially endowed with thrift and foresight.[62] A similar hypostatization is contained in Barton's belief that a state of poverty is generally accompanied by a great want of foresight.[63] Dumont, in particular, stressed the thought that the decrease of

[57] W. S. Thompson, *op. cit.*, p. 14.

[58] J. E. Wappaues, *Allgemeine Bevölkerungsstatistik* (Leipzig, 1859–61), I, 173.

[59] Samuel J. Holmes, *op. cit.*, p. 112.

[60] E. M. East, "The Agricultural Limits of Our Population," *Scientific Monthly*, XII, 551.

[61] Julius Wolf, "Die letzten Ursachen des Geburtenrückgangs unserer Tage," *Archiv für Sozialwissenschaft und Sozialpolitik*, XXXVII (1913), 919–29; *Der Geburtenrückgang und die Rationalisierung des Sexuallebens in unserer Zeit* (Jena, 1912); cf. Lucien March, *op. cit.*, p. 255.

[62] Sidney Webb, "Physical Degeneracy or Race Suicide," *Popular Science Monthly*, LXIX (December, 1906), 512–29; *The Decline in the Birth Rate* (London, 1907), *Fabian Tract Number 131*.

[63] John Barton, *An Inquiry into the Causes of the Progressive Depreciation of Agricultural Labor in Modern Times* (London, 1820).

population is not an economic question, but an intellectual, political, and aesthetic matter.[64] His theory of social capillarity has found a parallel in the statements of many other writers. For example, the British Commission of Inquiry on the declining birth-rate concluded: "Wherever political and social conditions bring a man or a class into a position in which he hopes to rise or fears to fall, the family will be restricted."[65] Leroy-Beaulieu attempted to show statistically that "a low birth rate goes hand in hand . . . . with democratic aspirations."[66]

Psychological explanations of conduct are implicit in the various studies which have been made to determine the correlation between demographic and economic factors. Quételet pointed out the relation between the price of grain and the number of marriages. Yule in 1906 investigated the connection between changes in price levels and the marriage rate.[67] "It is clear," said Guillard, "that the twofold production of corn and of men has proceeded in a parallel proportion."[68] Hector Denis showed that the number of marriages in Belgium followed the rise and fall of prices in coal.[69] Ogle discovered that the marriage rate varied in accordance with export values.[70] Dorothy S. Thomas noted the seasonal variations in the English marriage rate, corresponding to fluctuations in employment.[71] The study made by Ogburn and Thomas with reference to the United States (1870–1920) showed that in states for which statistics were available the marriage rate increased during times of prosperity and diminished during

[64] Arsène Dumont, *Dépopulation et civilisation: Étude démographique* (Paris, 1890).

[65] *Report of the British Commission on the Declining Birth Rate* (1920), p. 41.

[66] P. Leroy-Beaulieu, "The Influence of Civilization upon the Movement of Population," *Journal of the Royal Statistical Society*, LIV (1891), 378.

[67] G. U. Yule, "On the Changes in the Marriage and Birth Rates in England and Wales during the Past Half Century," *Journal of the Royal Statistical Society*, LXIX (1906), 88–132.

[68] F. S. Nitti, *op. cit.*, p. 95.

[69] H. Denis, *Recherches sur la matrimonialité en Belgique* (1883), I, *passim*.

[70] W. Ogle, "On Marriage Rates and Marriage Ages," *Journal of the Royal Statistical Society*, LIII (June, 1890), 253–80.

[71] Dorothy S. Thomas, "Changes in Marriage Seasons," *Economica*, IV (1924), 97–106.

times of depression.[72] R. H. Hooker showed a close correlation between the marriage rate in England and Wales (1861–95) and the amount of foreign trade.[73] Davies found a correlation for the United States between marriage rates and wholesale prices (1887–1906).[74] Giddings says: "The rate of population increase has actually been determined by the economic position of women."[75] Carr-Saunders and others have discussed practices which they suppose to indicate efforts to maintain the "optimum numbers," that is, the population conducive to the highest desirable standard of living in the various stages of civilization.[76] According to Keller, "This means, primarily, that people will not propagate beyond the capacity of the environment or the stage of the arts to support them according to their customary notion of what satisfactory living is."[77]

Although facts and opinions such as the foregoing might seem to supply adequate backing for a psychological theory of population, various contradictions are encountered. Facts are at hand which cannot readily be fitted into the theory. For example, it is impossible, as Sir William Beveridge has shown, to see the selective influence of prices in bringing about a fall of the birth-rate in one province of Holland and no fall at all in the next province.[78] Several studies of the relation between economic conditions and marriage rate show wide variations and inconsistencies from one country and period to another.[79]

[72] W. F. Ogburn and D. S. Thomas, "The Influence of the Business Cycle on Certain Social Conditions," *Journal of the American Statistical Association*, XVIII (September, 1922), 324–40.

[73] R. H. Hooker, "On the Correlation of the Marriage Rate with Foreign Trade," *Journal of the Royal Statistical Society*, LXIV (1901), 485–92.

[74] George R. Davies, "Social Aspects of the Business Cycle," *Quarterly Journal of the University of North Dakota*, Vol. XII, No. 2 (January, 1922).

[75] F. S. Giddings, *Democracy and Empire* (New York, 1900), p. 173.

[76] A. M. Carr-Saunders, *op. cit.*; Edward Cannan, "The Malthusian Anti-socialist Argument," *Economic Review*, II (1892), 71–87; *Wealth* (London, 1924), pp. 52–71.

[77] William G. Sumner and A. G. Keller, *op. cit.*, I, 72.

[78] Sir William Beveridge, "The Fall of Fertility among European Races," *Economica*, V (1925), 10–27.

[79] For a brief summary of these studies see P. Sorokin, *Contemporary Sociological Theories* (New York, 1928), p. 553.

The correlation between economic conditions and the birth-rate is even less marked than between these and the marriage rate. There is no uniform relation between the degree of national prosperity and the birth-rate. "Norway and Ireland, both relatively poor countries," as pointed out by Newsholme and Stevenson (1906), "have a high fertility, but Bavaria and France, which are relatively more prosperous, have one a high, and the other a low, birth rate."[80] During periods of extreme social disorganization the birth-rate may be voluntarily restricted, as was done by the Melanesians. They said: "Why should we bring children into the world only to work for the white man?" Before the time of Malthus the Marquis d'Argenson noted: ". . . . The population and marriage [are] quite dying out on all sides. . . . . They never marry and they do not even think of it. If others prompt them to it, they all make one reply, that it is not worth bringing into the world other unfortunates as miserable as they themselves."[81] On the other hand, the "masses" living in the disorganized conditions of England in the early nineteenth century were said not to have diminished the size of their families. According to one writer, they "were reckless, improvident, intemperate . . . . at the same time multiplying as carelessly as rabbits."[82] In Northern and Western Europe during the last six decades, the improvement in the standard of living has been accompanied by a decline in the birth-rate.[83] However, in Japan, according to G. C. Allen, a similar rise in the standard of living

[80] W. H. R. Rivers, *Essays on the Depopulation of Melanesia* (Cambridge, 1922), p. 104.

[81] F. S. Nitti, *op. cit.*, p. 97.

[82] H. Ellis, *Problems of Race-Regeneration* (New York, 1911), pp. 10–11; cf. M. O. Buer, *Health, Wealth and Population in the Early Days of the Industrial Revolution* (London, 1926), p. 25.

Concerning increase of slaves, as compared with free negroes in the United States, see George Tucker, *Progress of the United States in Population and Wealth in Fifty Years* (New York, 1843), p. 118.

[83] G. M. Mulhall, *Dictionary of Statistics* (London, 1892); *History of Prices since the Year 1850* (London, 1895); W. S. Thompson, "Standards of Living as They Affect the Growth of Competing Population Groups," *Scientific Monthly*, XVII (July, 1917), 57–65.

has not been accompanied by either a declining or a differential birth-rate.[84]

The variations between the birth-rates of the economic classes are likewise inconstant. In the latter days of Greece and Rome noble families became extinct because of the failure to reproduce,[85] but during the Middle Ages the so-called upper classes are said to have contributed more to succeeding generations than did the lower classes.[86] As a result of his study concerning the fertility of the various social classes in England and Wales from 1850 to 1911, Stevenson concluded that a differential birth-rate is, broadly speaking, a new phenomenon.[87] Other investigators have also shown that the upper classes in many societies of the past, as well as in some oriental societies today, have not contributed a relatively smaller proportion to the number of births.[88] The differential rate is again tending to disappear in the Euro-American culture. In Holland and Germany today the different economic classes are approximately equal in fertility.[89] In Stockholm the professional and upper classes have a higher birth-rate and are reproducing more rapidly than the working classes, according to Dr. Karl Edin.[90]

From the contradictory nature of the various data it is evident

[84] G. C. Allen, "The Population Problem in Japan," *Economica*, XVII (1926), 180–82; *Modern Japan* (New York, 1928), pp. 180, 191, 197, 198.

[85] J. R. Seeley, *Lectures and Essays* (London, 1870), pp. 51–52; C. E. Stangeland, *Pre-Malthusian Doctrines of Population* (New York, 1904), pp. 29, 33; W. C. D. Whetham and C. D. Whetham, *The Family and the Nation* (New York, 1911), p. 149; Nathan Allen, *Lessons on Population Suggested by Grecian and Roman History* (Boston, 1871).

[86] A. M. Carr-Saunders, *op. cit.*, p. 457.

[87] This difference was found to be small for marriages contracted before 1861, and its increase was at the maximum for those marriages contracted from 1891 to 1896.—T. H. C. Stevenson, "The Fertility of Various Social Classes in England and Wales from the Middle of the Nineteenth Century to 1911," *Journal of the Royal Statistical Society*, LXXXIII (1920), 401–32.

[88] P. Sorokin, *op. cit.*, p. 550.

[89] A. Grotjahn, "Differential Birth Rate in Germany," *Proceedings of the World Population Conference, 1927* (London, 1927), pp. 153–54; A. M. Carr-Saunders, Discussion before World Population Conference, in *Proceedings* (1927), p. 203.

[90] Karl Arvid Edin, "Fertility in Marriage and Infant Mortality in the Different Social Classes in Stockholm from 1919 to 1922," *Proceedings of the World Population Conference, 1927* (London, 1927), pp. 205–7.

that a declining birth-rate does not coincide uniformly with either a high or low, or with a rising or a falling, plane of living. Within the bounds set by the conditions of survival both are culturally determined and there is no uniform or invariable connection between them. "The means of existence," Bastiat said, ". . . . do not constitute a fixed quantity; they depend upon the state of manners, of opinion, and of habits."[91] The requisite provision for marriage and a family, according to Rickards,

is regulated, not by a fixed quantity or kind of food, but by usage and opinion [and] is continually enlarged as civilization advances. . . . . The English peasant would not increase and multiply upon such means of existence as suffice for the Russian serf or the Hindoo at the present day; neither would he do so if his scale of comforts were suddenly reduced to that of the villeins who preceded him a few centuries ago upon his own soil. . . . . Increased self-respect follows upon each step that elevates him in the social scale, and the virtues of prudence, economy, and forethought are its fruits.[92]

The causes of these differences in customs of consumption, another early economist says

are to be found in everything that has affected the past or affects the present, condition of society,—in ancient institutions, in modern improvements, in past and present laws, in battles lost and won, in reformations of religion, in the progress of science, in the manners of the higher classes, in the information of the lower, in everything which man can neither suddenly alter nor create, and which connects his present mode of existence with that of his ancestors and his posterity.[93]

The separable character of the birth-rate and economic questions has been recognized by some writers. Dumont asserted that "if rich nations, like England, have preserved the standard of births at the same level, this is caused by a persistence of family spirit and of tradition."[94] Mill observed:

Where a labouring class who have no property but their daily wages, and no hope of acquiring it, refrain from over-rapid multiplication, the cause, I believe, has always hitherto been, either actual legal restraint, or a custom of some sort, which, without intention on their part, insensibly moulds their conduct, or affords immediate inducements not to marry.[95]

[91] Frédéric Bastiat, *Harmonies of Political Economy* (Edinburgh, 2d ed.), p. 422.

[92] George M. Rickards, *op. cit.*, pp. 44–48.

[93] T. Perronet Thomson, *True Theory of Rent* (London, 1830), p. 16.

[94] Quoted by F. S. Nitti, *op. cit.*, p. 77.

[95] J. S. Mill, *Principles of Political Economy* (New York, 1909), p. 338.

T. A. Coughlan correctly, though with insufficient analysis, has noted that the birth-rate and marriage rate do undoubtedly respond to the ease of securing a living, but that the decline has been so constant as to point "to something outside the economic factors." He thought it to have been due to "a change of moral tone, a matter entirely apart from and independent of prosperity and adversity."[98] If the "moral" is made to comprise general culture, this suggestion is a significant improvement upon most of the theories, explicit or implicit, which burden current literature. It implies that the birth-rate is subject to non-economic factors, and that to this extent it may be less dependent upon individual psychology than upon the group mores in providing behavior ways and motivations for their adoption.

The reaction of the standard of living upon the birth-rate in the Euro-American and other cultures seems logical because it is sanctioned in the given mores, and because the hierarchy of accepted values suggests and encourages the given form of "prudential" behavior. But since the same type of economic situations may be met in other ways, the conclusion must be drawn that (within the limits permitting of survival) there is no inherent and inevitable connection between the birth-rate and economic situations. This is implied in the varied types of responses made to similar economic situations by people of different classes and civilizations and in different periods of history. By custom, individuals of one group resort to the small family system as a means of improving their economic status, while those of another group, which is lacking in such a custom, fail to make the same connection. The supposition that this difference is due to psychological factors implies that the individuals concerned differ in regard to the nature of their mental processes. This is not supported by any demonstrated facts, and furthermore is based on the *pars pro toto* fallacy.

Standardized behavior ways, in the aggregate, are not individual inventions. There are "always cultural influences which cannot be determined or modified at will, superindividual powers

[98] T. A. Coughlan, discussion of Arthur Newsholme and T. H. C. Stevenson's paper, "Human Fertility as Shown by the Corrected Birth Rate," *Journal of the Royal Statistical Society*, LXIX (1906), 135.

which go on working, independent of efforts either to accelerate or to prevent."[97] Therefore the explanation of the behavior relative to the birth-rate in large groups must normally be sought in the institutional facts, rather than in the individual's rationalizations about his own custom-dictated behavior. While there are psychological and biological accompaniments in this, as in all behavior, these do not explain the custom; for they would have functioned equally readily in reference to some other custom. The cultural facts are data which exist in their own right.[98] They do not require naturalistic and psychological postulates as justification and interpretation. Neither do they *sui generis* yield to explanation in physiological or psychological terminology. The "effective desires" of which Rae spoke[99] are complex sociological facts, mediated by culture and by interaction between persons. Consequently, in every civilization births are, according to expectations, contributed by the persons who have acquired the prevailing culture and who have been conditioned by the stimuli arising in society.

These stimuli are themselves highly complex systems of moral, utilitarian, and aesthetic sentiments. They are embodied in literature, commercialized entertainment, folk lore, codes, and innuendoes. In the words of Alfred Marshall, "Society exercises pressure on the individuals by religious, moral, and legal sanctions, sometimes with the object of quickening, and sometimes of retarding, the growth of population."[100] This control is exercised through the esteems bestowed in the group upon marriage, the

[97] H. W. Methorst, "Results of Differential Birth Rate in the Netherlands," *Proceedings of the World Population Conference* (London, 1927), p. 177.

[98] Cf. Charles H. Judd, *Psychology of Social Institutions* (New York, 1926); A. L. Kroeber, "The Possibility of a Social Psychology," *American Journal of Sociology*, XXIII (1917), 635–50; "The Superorganic," *American Anthropologist*, N.S., XIX (1917), 163–213; W. D. Wallis, "The Independence of Social Psychology," *Journal of Abnormal and Social Psychology*, XX (1925–26), 147–50; Robert H. Lowie, "Psychology and Sociology," *American Journal of Sociology*, XXI (1915–16), 216–29; *Culture and Ethnology* (New York, 1917).

[99] John Rae, *The Sociological Theory of Capital* (New York, 1925), pp. 354 ff.; "Letters of Rae (1796–1872) to Mill on the Malthusian Doctrine of Population," edited by C. W. Mixter, *Economic Journal*, XII (1902), 112–20.

[100] Alfred Marshall, *Principles of Economics* (New York, 1905), p. 173.

possession of heirs and of large or small families, and through the integration of these items with other cultural or social factors in the given society.

In many societies marriage is essential to the acquisition of a favorable position in the group.

> The Korean is nobody until he is married. He is a being of no account, a "hobble-dehoy." The wedding-day is the entrance on respectability and manhood and marks a leap upwards on the social ladder. . . . . His name takes the equivalent of "Mr." after it; honorifics must be used in addressing him—in short, from being "nobody," he becomes "somebody."[101]

Similarly, to the Hindu, who holds celibacy in disesteem, "marriage is the most important and most engrossing event in his life; it is the subject of endless conversation and of the most prolonged preparations."[102] At some Spartan festivals bachelors were dragged around the altars and beaten by the women, as a sign of disgrace.[103] Epaminondas, when asked what one unmarried and childless could do for his country, replied, "Die for it."[104] Most European countries at some time within the modern centuries have imposed disabilities upon bachelors and bestowed recognition or rewards upon the married.[105] On the other hand, asceticism, such as that practiced by the early Christians and other religionists, indicates the disesteem which was sometimes attached to marriage.[106] Constantine gave special privileges to celibates.[107]

Not only the married state but also the numbers of children are regarded differently in various cultures. In early patriarchal society, according to C. E. Stangeland, the social rank of a man was determined by the number of his children.[108] This was also true of the Persians, according to Herodotus.[109] In some tribes of

[101] W. G. Sumner and A. G. Keller, *op. cit.*, III, 1534.

[102] O. Chrisman, *The Historical Child* (New York, 1920), p. 87.

[103] George Ensor, *An Inquiry Concerning the Population of Nations* (London, 1818), p. 3.

[104] *Ibid.*, p. 9.

[105] C. E. Stangeland, *op. cit.*, pp. 122–37; George Ensor, *op. cit.*, pp. 9, 12–15.

[106] Monier Williams, *Buddhism and Its Connection with Brahmanism and Hinduism* (New York, 1889), p. 152; Henry C. Lea, *Celibacy* (Boston, 1884).

[107] Harold Wright, *Population* (New York, 1923), p. 17.

[108] *Op. cit.*, p. 40.

[109] George Ensor, *op. cit.*, p. 5.

American Indians, Heriot relates, the chiefs were elected because of their numerous offspring.[110] Children have also been desired to carry on the family name or to serve as agents for attaining or perpetuating family ambitions and honor.[111]

When numbers are esteemed, the pressure of the group is exerted upon the individual for the purpose of encouraging increase. Religious sanctions may be invoked with this intention. "Multiply and replenish the earth" is the command of many religions. Pythagoras declared that men should marry in order to leave new adorers of God.[112] "The greater the number of souls that are added to the numbers of the elect," it has been believed, "so much the richer is nature's hymn of praise."[113] Another doctrine holds that children are sent directly as blessings from God. Luther's statement, "The more children, the more good luck,"[114] and the belief that "for every mouth there are two hands"[115] are further expressions of this attitude.

Again, the rearing of children may be regarded as a patriotic duty, owed to the state by every citizen. In ancient Greece children were considered desirable for strengthening the ties between the individual and the state. The laws of Sparta gave special privileges to citizens having three or more children. The *Bevölkerungspolitik* which prevailed throughout Europe from the time of Colbert till the middle of the eighteenth century was based upon the belief that populousness was necessary for the happiness of the people and especially for the security and great-

[110] George Heriot, *Travels through the Canadas* (London, 1807), p. 551.

[111] "In the days when a man owed his existence in the first instance to himself, and only in a very secondary manner to the State, it was very important, not only that his sons should be able to speak with the enemy in the gate, but that they should be resolute to leave no wrong done unavenged."—Karl Pearson, *National Life and Character* (London, 1900), p. 245.

[112] George Ensor, *op. cit.*, p. 8.

[113] Henry Pratt Fairchild, "Optimum Population," in *Problems of Overpopulation*, edited by Margaret Sanger (New York, 1926), pp. 31–32.

[114] Martin Luther, *Tischreden* (Weimar, 1914), III, 458, No. 3613.

[115] Henry George, *Progress and Poverty* (New York, 1879), p. 126; Piercy Ravenstone, *A Few Doubts as to the Correctness of Some Opinions Generally Entertained on the Subjects of Population and Political Economy* (London, 1821), pp. 177 ff.

ness of the state.[116] Similar statements were expressed more recently by Roosevelt, Harding, and Mussolini. Roosevelt's assertion is representative: "Even more important than ability to work, even more important than ability to fight at need is it to remember that the chief of blessings for any nation is that it shall leave its seed to inherit the land."[117] "To be a worthy citizen, you must have four children, at least," declared Mr. Roosevelt. "If you have three, you will receive land in the Campania," promised Julius Caesar, in keeping with the traditional policies of state.[118]

On the other hand, small families are encouraged by some cultures. The Thracians are said to have mourned when a child was born and to have rejoiced at its death.[119] Various preliterate groups made regulations prescribing the maximum number of children that might be reared in each family. This number varied considerably. For example, in Radeck, as one writer relates, no woman was allowed to bring up more than three children unless she were the wife of a chief.[120] The Abipones of South America do not rear more than two children per family. But the small family system, as a culture trait, is not restricted to preliterate groups. It is a growing characteristic of some Euro-American areas, where it is re-enforced and aided by other dominant elements of this culture, such as individualism, conspicuous consumption, mass education, high mobility, and the organization of the family on the basis of the simple marriage group.[121] One might readily grant that the prudential factor is also increasing and that

[116] C. E. Stangeland, *op. cit.*, pp. 118–37.

[117] C. V. Drysdale, *The Small Family System* (New York, 1917), p. 100, quoting Mr. Roosevelt's lecture at the Sorbonne, April, 1910, as given by the *London Daily Chronicle* of April 25, 1910.

[118] Elsie Clews Parsons, *Social Rule* (New York, 1916), pp. 36–37.

[119] George Ensor, *op. cit.*, p. 10.

[120] See Carr-Saunders, *op. cit.*, pp. 197–242 for examples.

[121] W. S. Thompson, "Race Suicide in the United States," *American Journal of Physical Anthropology*, III, No. 1 (1920), 97–146; Lucien March, "The War and the Birth Rate in France," *Eugenics, Genetics and the Family—Papers of the Second International Congress of Eugenics*, I (Baltimore, 1923), pp. 243–65; Nathan Allen, *Population* (Lowell, Mass., 1870), pp. 22–24; T. Veblen, *The Theory of the Leisure Class* (New York, 1911), pp. 15, 17, 38, 68, 169.

this is stimulated by urbanization and child-labor legislation.[122] But a reduction of the family in response to these changes is given in the culture itself, and is not known to be an independent invention by individuals.[123] Indeed these situations might be met in other ways or might evoke responses not designed to decrease the burden of rearing children.

The present-day notions favoring the small family have also been linked with the cult of "the lady," which, with various adaptations, has come down from the days of chivalry. According to this cult, emphasis has been placed upon the wife as a symbol of social status, and this status has been thought to be enhanced by the scarcity of children. Conventional tastes of the dominant class have favored the delicate and fragile type, in contrast to the more robust build of the peasantry and other subordinates. Even the athletic girl, when favored in customs, has been required to preserve these traditional labels of femininity. In this cult the "lady" is esteemed, not for her maternal or her economic and intellectual functions, but for her adventitious character.[124]

The current attitudes are a popularization of those prevailing in the eighteenth century, when Defoe commented that it was considered "below a lady of quality to trouble herselfe in the nursery, as 'tis below the gentleman of quality to trouble himselfe with a library."[125] These attitudes are further illustrated by the statement of a recent French writer: "A family of five or six children was once an ordinary thing; now it is regarded as a veritable affliction. The unhappy parents are blamed; the fact is regretted and they are laughed at; this is worst of all; this is the reason why the upper classes are failing."[126] A similar viewpoint,

[122] David Heron, *op. cit.*, p. 19.

[123] Cf. Arsène Dumont, *Dépopulation et civilisation* (Paris, 1890), pp. 279–92; 321–36.

[124] For a discussion of many other ways in which the position and function of women have been organized in different civilizations, see Robert Briffault, *The Mothers* (New York, 1927), 3 vols.

[125] Quoted by Mary Burt Messer, *The Family in the Making* (New York, 1928), p. 304.

[126] J. Rochard, *Traité d'hygiène sociale*, p. 322, quoted by F. S. Nitti, *op. cit.*, p. 115.

divorced from economic considerations or needs, was expressed by Mill, who said: "No advance in public morality can be looked for until numerous families come to be regarded with the same contempt as drunkenness and other corporeal excesses. The moral obligation not to have too many children could, if the case called for it, be changed into a legal obligation."[127] "We were learning . . . . ," said William Godwin, "to look askance and with suspicious eye upon a human being, particularly upon a little child."[128]

The preference for the small family which has long existed among the upper classes has gradually spread to wider areas, and to other strata and other culture groups, the progression being retarded by distance and by differences in the general culture and the customs with reference to the family. Already the working classes, it has been observed, have smaller families, on the average, than they did a half-century ago.[129] The French peasants soon adopted the preference noted among the upper classes for small families, thereby keeping their numbers almost stationary. Though resistance against subdividing landholdings be granted to have been an objective,[130] this does not place the given economic datum outside the total culture complex. This conclusion is implied in the fact that other groups meet the same situation in other ways.

Like other cultural facts, the family system migrates or fails to migrate into new areas, depending upon factors comparable to those aiding or hindering other culture diffusion. Dumont noted that when the rural regions begin to copy the customs of the city, the birth-rate records the effect.[131] Newsholme and Stevenson found that both the urban and the rural counties of England reduced their birth-rates between 1881 and 1903, but that the greater reduction took place in the rural areas, thus approximating the birth-rate of the urban centers. There was, they thought,

[127] J. S. Mill, *op. cit.*, I, 362–63.

[128] William Godwin, *Enquiry Concerning Population* (London, 1820), p. 110.

[129] H. Ellis, *The Problem of Race Regeneration* (New York, 1911), p. 57.

[130] J. S. Mill, *op. cit.*, I, 157; 281 ff.; C. V. Drysdale, *op. cit.*, p. 105.

[131] Arsène Dumont, *op. cit.*, p. 339.

no essential reason why the urban birth-rate should be lower than that of the rural areas. "The fact that in Germany and elsewhere the reduction of the birth rate is chiefly shown in great cities," they say, "is an indication not that urbanization favors a low birth rate, but that the operative causes of a low birth rate have not yet affected the rural population of that country to a great extent."[132] That is, the folk ways regarding the size of the family have not yet been extended to the rural areas.[133]

Similar tendencies for the diffusion of the "small family system" from one culture area to another have been noted. It has been frequently shown that immigrants tend to approach in fertility the index of the native populations where they take up their abode.[134] Sweeney has noted that the less prolific races tend to become more prolific in new countries, as, for example, the French in Canada and the British in Australia.[135] In America, however, where "having a family is not an American 'ideal' . . . . this is affecting everyone down to the poorest immigrant. . . . ."[136]

As in the case of births, so with reference to deaths, a system of beliefs and practices designed to control the biological event is built up. The physiological and psychological theories of population growth make provision for the elimination by death, chief-

[132] Arthur Newsholme and T. H. C. Stevenson, "Human Fertility as Shown by the Corrected Birth Rate," *Journal of the Royal Statistical Society*, LXIX (1906), 63.

[133] Although the birth-rate of Stockholm, according to Edin's statistics, is but one-half that of the surrounding rural districts, the fertility of the city population is greatest among the couples born in Stockholm.—Karl Avid Edin, *op. cit.*, pp. 206, 207.

[134] Joseph A. Hill, "Comparative Fecundity of Women of Native and Foreign Parentage in the United States," *Journal of the American Statistical Association*, XIII (1912–13), 583–604; W. S. Thompson, "Race Suicide in the United States," *American Journal of Physical Anthropology*, III, No. 1 (1920), 97–140; Frederick S. Crum, "The Decadence of the Native American Stock," *Journal of the American Statistical Association*, XIV (1914–15), 215–23; R. P. Kuczynski, "The Fecundity of the Native and Foreign-born Population in Massachusetts," *Quarterly Journal of Economics*, XVI (1901–2), 136; 141–86.

[135] J. S. Sweeney, *op. cit.*, p. 71.

[136] *Report of the British Commission of Inquiry on the Declining Birth Rate* (1920), p. 426.

ly as the result of pressure upon subsistence. But it is evident that customs are also a factor in this regulation of numbers. There is no proof that the majority of the practices of taking life or of trying to prolong it were intended to carry out a population policy. Whether there shall be fœticide or infanticide, paracide, human sacrifice, blood feuds, or war is largely a matter of the mores. Theoretically, the sentiments and ideas involved may include economic considerations, but usually the utilitarian factors are interwoven with various elements in the culture complex.

It is safe to assume that infanticide was often prompted by the desire to preserve the food supply. However, many customs pertaining to infanticide were obviously non-economic in origin, and were connected with other cultural items. Various kinds of abnormality, such as albinism, malformation or unusual dentation, irregularities in delivery or in the number of children at a birth, or other incidents which, according to primitive beliefs, implied spirit intervention, or which might result in misfortune, were considered adequate reasons for depriving children of life.[187] "The Kamachadales used to destroy children who were born in very stormy weather; in Madagascar infants born in March or April or in the last week of a month, or on a Wednesday or Friday were exposed, drowned, or buried alive."[188] The Chinese in one village, according to a traveler's account, destroyed one-half of their female infants.[189]

The widespread custom of abandoning or killing the sick or aged, although probably resting at times upon economic considerations or perchance having other prudential advantages, were often prompted by magical beliefs. Other forms of homicide, such as blood feuds, suicides, human sacrifices, and witch-execu-

[187] Dudley Kidd, *Savage Childhood* (London, 1906), pp. 46–47.

Some villages in India have been known to be almost entirely lacking in grown-up girls. This, according to Colonel McCullough, was due to the superstition which condemned to death those born in a particular position.—*Selections from the Records of the Government of India, Foreign Department*, No. LXXVIII, cited by T. C. Hodson, "Female Infanticide in India," *Man*, XIV (1916), 92.

[188] Edward A. Westermark, *Origin and Development of Moral Ideas* (London, 1912–17), I, 394–95.

[189] Cf. John Weyland, *The Principles of Population and Production* (London, 1816), 132–33.

tions, all of which materially retarded numbers, were not, so far as is known, designed for this purpose.[140] They belong to other complexes. Likewise wars, which are frequently asserted to be the direct results of population pressure, are patently parts of cultural systems and yield to explanations as do other social institutions.[141] The approved patterns may prescribe wars for spreading a given culture,[142] universalizing a religious creed, for gaining spoils, attaining glory, or disciplining the young men. Elimination of numbers by customary practices, as well as the restriction of the birth-rate, therefore, fails to establish a sufficient physiological or psychological premise for the explanation of trends in population growth.

Aside from the customs relating to generation and to removals by homicide, there are other cultural items which affect the growth of population. Fluctuations in methods of food production or conservation and in medical practices also bring about variations in survival rates, other factors remaining constant. The cycles of population growth are thus complex affairs, which comprise unequal rates of change in several phases of the group culture. In recent centuries this growth was accelerated because the methods of food production and preservation increased simultaneously with improvements in medical science and with the persistence of the former birth-rate customs. Since the upward trend of factors reducing the death-rate has continued, the present declining rate of population increase must be ascribed to changes in the customs regarding births. These customs, like other social and humanistic facts generally, are subject to modification by innovation, diffusion, growth, and decline, and like

[140] It has been estimated that nine million victims, mostly women, lost their lives during the Christian era, as a result of witchcraft delusions.—M. M. Knight *et al.*, *Taboo and Genetics* (New York, 1920), p. 198.

From twenty to fifty thousand persons were thought to have been slain each year as sacrificial offerings by the Aztecs.—O. Chrisman, *Historical Child* (New York, 1920), p. 28.

[141] Cf. Archibald Alison, *The Principles of Population* (Edinburgh, 1850), I, 273 ff.

[142] Ezra Bowen, "Paleo-Malthusianism," *Scientific Monthly*, XXIX (1929), 538–45.

other cultural data can be investigated without postulating naturalistic "laws."

In fine, a *general* population theory must rest upon culture premises. Such a theory will not imply a single or uniform factor as the cause for the varying rates of growth. It will search for distinctive types of causal factors in different social groups, and will assume that varied combinations of material and non-material culture elements may account for observed statistical trends. Such trends measure, but do not disclose nor explain, the processes which are actually involved. These are normally mediated through social factors which are subject to change. Therefore any attempt to predict long-time population cycles will probably go as far astray as did the forecasts of Malthus.

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ECONOMIC INFLUENCES UPON THE CORPORATION LAWS OF NEW JERSEY

THE development of corporation law in New Jersey reveals admirably the molding influence of certain economic factors. The evidence seems conclusive that the creation and the regulation of the early corporations were results of the geographic position of the state; that the general corporation law was the outgrowth of competition among the railroads; and that New Jersey became the "home of the trusts," not because trusts were regarded as desirable, but because the state was heavily in debt and needed an increased income. Corporation law was virtually determined by the casual, almost accidental, influence of these economic forces.

I. SOME EARLY DEVELOPMENTS IN NEW JERSEY CORPORATIONS (1789–1846)

The first corporations chartered in New Jersey after 1789 did not seek the development of the natural resources of the state so much as the exploitation of its strategic position. The state lay in a remarkably advantageous position so far as commerce was concerned. Located east of Pennsylvania, it fronts the Atlantic and forms one side of New York Harbor; on the south and southwest, it borders Delaware Bay; while the northern boundary stretches forty miles north of New York City. This location was of immense importance in the early history of industry in New Jersey. On the northeast is New York, the nation's largest city, while on the southwest is Philadelphia, in early times a near rival in size to New York. New Jersey stands as a bridge between them. Overland traffic must either cross the bridge or make a journey, by land or sea, of twice the distance to avoid it. Without rich natural resources of her own, New Jersey capitalized her strategic position and became an indispensable factor in transportation between the shipping centers of New York and Philadelphia.

At this early period in the state government, companies were

not organized according to general corporation laws, but by special acts of the legislature. The promoters of each enterprise felt free to secure from the legislature whatever rights and privileges they could persuade it to give. On the other hand, the state believed that it could scrutinize the formation of companies more closely and regulate them more strictly if each corporation were required to have special legislative sanction before it could do business. Finally, the number of enterprises seeking charters was not sufficient to make general corporation laws a necessity.

One of the first corporations of importance in New Jersey was chartered in 1791. The association of Alexander Hamilton with the company, and the fact that the charter became a pattern for subsequent legislation, make this undertaking of more than passing interest. The corporation was called the Associates of New Jersey Company, and it was authorized to "foster useful manufactures, deepen harbors, cut canals, ..." etc.[1] The company received outright ownership of thirty-six square miles of land upon which it founded the city of Patterson. In addition, the company was given the power of eminent domain over land or property rights necessary for its purposes.[2] The property of the corporation was entirely exempt from taxes for ten years, and its goods, profits, and chattels were to be perpetually exempt.[3] The capital was fixed at one million dollars with the power to hold property valued up to four millions. The governor was authorized to buy stock up to $100,000 for the state, and various other smaller favors were granted to the new corporation.[4]

Recognizing the unique position of New Jersey with reference to New York, the Associates bought extensive holdings of land along the Jersey shore with a view to using their property for ferry purposes. In fact, the company's holdings became so extensive as to create a monopoly of the ferry business. Hamilton shrewdly saw the advantages of the monopoly and sought to retain it for the Associates by reserving, by means of a special form, the ferrying rights from any land which the corporation

[1] W. Patterson, *Laws of the State of New Jersey, 1703–1799* (New Brunswick, 1800), p. 104.

[2] *Ibid.*, p. 108.

[3] *Ibid.*, p. 105.

[4] *Ibid.*, p. 108–15.

might later sell.[5] These privileges, as Hamilton had prophesied, were to become tremendously valuable and the reservation of the ferrying rights was to have a powerful effect upon later industrial development in the state. The great factor in the early development of New Jersey was to be transportation, and this the Associates were in a position to control.

During the period of the special charter system, which continued until 1846, each company could exercise only the powers, great or small, which were specified in its charter. There were no general powers inherent in corporate organization. The very name, however, of the "Morris Canal and Banking Company" shows how diversified were the fields of activity which a single corporation might undertake.[6] A few other companies, chartered during those years, and which have continued in some form from that time to the present, are the New Jersey Hemp and Flax Manufacturing Company, the Columbian Steamship Company, and the Passaic and Hackensack Ferry and Road Company, all of which were chartered in 1830.[7] The famous Camden and Amboy railroad was chartered in 1831.[8] In New Jersey, the year 1840 is typical of the industrial growth of that period between 1825, when business began to take longer strides, and 1846, the date of the first general corporation law. The statutes for 1840 show that forty corporations were granted new charters or supplements to old ones.[9]

On the whole, the legislature inclined more to liberality than to niggardliness in investing corporations with power. Every possible encouragement was extended to aggregations of capital aiming at the development of state resources or industry, and many charters were granted for these purposes which provided for valuable privileges. An Act of 1829, however, sounded a note of caution in the generous grants to corporations. The law was designed to prevent fraudulent practices, and to protect the creditors of corporations. It stated that "after being de-

[5] W. E. Sackett, *Modern Battles of Trenton* (Trenton, 1895), I, 11.

[6] *Laws of New Jersey* (1824), p. 158.

[7] *Ibid.* (1830), *passim.*

[8] *Ibid.* (1831), pp. 88–91.

[9] *Laws of New Jersey* (1840), *passim.*

clared insolvent through regular judicial proceedings, the corporation is enjoined from carrying on any other transactions and its affairs are placed in the hands of a commission or receiver."[10] A further indication that the state was becoming aware of the need for guarding against abuses is to be found in section 8 of the charter granted to the Bank of Belvidere in the same year: "The total amount of debts which the corporation shall owe, exclusive of deposits, shall not exceed double the amount of capital paid in."[11] This provision seems to have been included thereafter in the charters of all banking companies. While the Act of 1829 provided that all books, vaults, etc., be placed at the disposal of the chancellor in order that the conditions of suspected companies might be investigated, encouragement, on the whole, surpassed restriction, and the desire to promote outdistanced caution.

Agitation for a railroad in New Jersey had begun as early as 1815, and the legislature had actually granted a charter to the New Jersey Railroad Company.[12] The project was soon dropped and the charter was forfeited.[13] Agitation for a railroad between New York and Philadelphia continued, however, and a number of prominent New Jersey citizens became interested in the enterprise.[14] Obviously the road would lie wholly within New Jersey, for the shortest route between the two cities was a straight line between Camden, on the Jersey side of Delaware Bay, and Amboy, on the southwest bank of the Raritan River and Lower New York Bay.

Railroads, in 1830, were new ventures in which capital was loath to invest. They were expensive; the state government might burden them with oppressive legislation; the enterprise might not prove a practical or a profitable one. It was thought that the entire road could be used only two or three months of the year.[15] But the New Jersey legislature was enthusiastic. It

[10] *Ibid.* (1829), p. 58. [11] *Ibid.*, p. 63.

[12] *Laws of New Jersey* (1815), p. 68.

[13] J. O. Raum, *The History of New Jersey* (Philadelphia, 1877), II, 334.

[14] T. F. Gordon, *Gazetteer of the State of New Jersey* (Trenton, 1834), p. 19. This volume is bound with a *History of New Jersey* by the same author.

[15] Gordon, *op. cit.*, p. 20.

soon became evident that the company which would build the railroad could virtually dictate the terms of its own charter. Finally, to induce a group of fifteen men who were considering the venture to throw aside their fears and to undertake it, the state granted them various highly monopolistic rights, which were later to give rise to bitter contention and strife.

In the charter, the state reserved the privilege (which it never exercised) of purchasing one-fourth of the total amount of the capital stock, which was to be, in all, one million dollars. The Camden and Amboy was also assured that no competing company would be chartered to build a road within three miles of its line for nine years after the Camden and Amboy should be completed. By far the most valuable favor conferred upon the new corporation was that of tax exemption. The only revenue the state would receive was to be the income from its stock and a trifling transit tax which was imposed upon traffic.[16] The tax exemption feature of this charter, a model for several later grants, was to prove a most difficult point in the state's financial problems.

The Camden and Amboy and the Delaware and Raritan Canal Company were consolidated February 15, 1831. A supplement to the railroad charter, as amended by the legislation in that year, provided that, in exchange for one thousand shares of stock to be given to the state, the consent of the Camden and Amboy must be obtained before any competing roads could be chartered.[17] A year later, the railroad agreed that it would pay a sum of at least $30,000 annually to the state, as dividends upon the state-owned stock or as a transit tax.[18]

An application, by a company known as the New Jersey Railroad and Transportation Company, was made to the legislature in 1831 for a charter for a railroad to be constructed between Jersey City, on the western shore of New York Bay, and New Brunswick. The Camden and Amboy promptly refused to give its permission and sought to prevent the legislature from granting the franchise. After a bitter political fight the petition

[16] *Laws of New Jersey* (1830), pp. 88–91.

[17] *Laws of New Jersey* (1831), p. 124.

[18] *Ibid.* (1832), pp. 79–80.

was, at first, denied. "But by one of those arrangements with which all legislatures are familiar," the opposition of the Camden and Amboy was withdrawn and a charter was granted to the new company.[19]

Both the New Jersey Railroad and the Camden and Amboy now came face to face with a startling obstacle. This was the fact that the Associates of New Jersey still controlled the shore at Jersey City so far as transportation facilities were concerned. If either railroad was to establish a complete connection with New York, it must do so by means of the older company. The New Jersey Railroad and Transportation Company saw the great advantage of owning its own terminal on the bay and set about to secure it. The courts had already confirmed the absolute control of the Associates over property which they had obtained for their many purposes.[20] The railroad had only one other course to pursue. It bought a controlling interest in the older company at an average price of $430 per share.[21]

The advantage of the New Jersey Railroad over the Camden and Amboy, after the former had secured its water front, was apparent. The latter road had prospered but it must obtain direct terminal connections at once if it were to continue to meet the competition of its active rival. The New Jersey Railroad now owned all the rights of the old Associates, and if the Camden and Amboy was to obtain a New York terminal, it must do so through its rival. This it did, simplifying the situation by buying its competitor on terms dictated by the seller.[22]

The effect of the purchase was soon evident. The Camden and Amboy, now known as the United Railroad and Canal Company, became by far the most powerful monopoly in New Jersey, and its influence was enormous. According to the terms of the charter, it paid no property tax and only a small transit duty of ten cents for each "through" passenger and fifteen cents for each ton of freight, which relieved the burden of this from the

[19] G. R. Powell, *History of Camden County, New Jersey* (Philadelphia, 1866), p. 352.

[20] The case of the *Associates of New Jersey* v. *Jersey City*, 8 *N.J. Equity*, 715, shows the character of the rights which the Associates Company enjoyed.

[21] Sackett, *op. cit.*, I, 11. [22] *Ibid.*, I, 15.

Jersey citizens and threw it upon citizens of other states. The government of New Jersey felt gratified at the steady income from its stock and the transit duties. One New Jersey writer said:

> It was the duties paid by these companies that built our State Prison and Lunatic Asylums . . . . ; also our beautiful State House . . . . ; and, in fact, the means for all of our internal improvements, as well as a large amount towards the support of our magnificent system of public schools, is derived from this source, thereby saving our citizens from an enormous yearly tax, which must have accrued through our extensive internal improvements, did we not have some other means of meeting the expenditure.[23]

Other franchises similar in character to that of the United Railroad were isued to several other roads by the legislature before the dangers inherent in such charters had appeared. In almost every instance special monopolies were granted to the railroads which reserved to them all traffic rights between the points they were authorized to connect.[24] Privilege and exclusion, with a minimum of state regulation and control, were the rule in order to induce capital to invest heavily. Transportation by land and water, stimulated by the nearness of the nation's two largest cities, was New Jersey's largest industry. The great "industrial" corporations had not yet entered upon that era of development in which oil, iron, copper, coal, tin, and whiskey were to demand and receive the favor of the states. In this earlier period it was to the railroads and the steamship and canal companies that the state gave valuable trade privileges and monopolies.

The special charter system was subject to a number of abuses. If every proposed corporation must obtain the consent of the legislature, then it must make friends of the legislators.[25] Incorporation for many companies, of course, was purely perfunctory, but for the larger enterprises, whose stock would become marketable securities, the legislature often had to be persuaded in various ways. Lobbies and personal pressure were methods known to the privilege-seeker even of that early day,

[23] Raum, *op. cit.*, p. 341. In 1876 the United Railroad paid the state $298,128.96.

[24] See the terms of several charters cited by Gordon, *op. cit.*, p. 23.

[25] E. Q. Keasbey, "New Jersey and the Great Corporations," *Reports of the American Bar Association* (1899), p. 387.

and in some instances darker and more sinister methods must be called upon to explain the inconsistency and vacillation which the legislature displayed.[26]

One bad result of this method of creating corporations was the deliberate exclusion of many legitimate corporations because of the opposition of others already in the field. The rail and water transportation companies, with their monopolistic rights, prevented the establishment of competing corporations and thus actually hindered the industrial development of the state. Although the early charters were granted by the legislators with a sincere regard for the public interest, time showed that the gift of monopolistic rights was really opposed to the object sought, namely, the promotion of the public welfare.

Another evil consequence of the method was the encouragement which it gave to the promotion of fraudulent schemes. Many companies were formed, secured charters from the state, were promoted just enough to prevent the forfeiture of their charters, and then were either abandoned after the sale of stock, or were sold to some active corporation to whom the special features were worth much. Such a purely fictitious enterprise was the Camden and Egg Harbor Railroad, ostensibly formed to connect Camden with the sand flats of the Atlantic Coast.[27] Although the company was capitalized for $200,000, not a foot of road was ever laid. Another abortive project, called "The People's Railroad," failed immediately after its incorporation.[28] However sincere and honest the legislators themselves might be, they were not always able to discern the motives of those who applied to them for charters.

THE FIGHT FOR GENERAL CORPORATION LAWS (1846–75)

Aside from the political and industrial abuses attending the method of granting corporation charters, there were technical

[26] Powell, *op. cit.*, p. 352.

[27] Powell, *op. cit.*, pp. 352–53.

[28] Raum, *op. cit.*, p. 342. Although it is impossible to determine the number of enterprises which were promoted by men who had no intention of completing them, of the 282 railroad charters which were granted between 1830 and 1871, only 55 were actually used.

difficulties which made such charters the source of many troubles for New Jersey. The articles of incorporation for each company defined at length the exact rights and duties of the corporation, and marked out as accurately as possible the range of activities in which it might engage. A bank might engage in banking and in such other activities as its special franchise permitted. So might a railroad, or any other corporation, if it had secured a sufficiently broad charter. There was no arguing in court that, because a company had been incorporated, it was, *ipso facto*, entitled to certain powers or was subject to certain limitations. The particular charter in question was the final authority for the corporation, and every legislature was free to decide the terms and conditions of the charters it granted, according to its inclination.

Under such a system, many interpretations were bound to arise. Ambiguous clauses in the charters were invoked upon occasion in support of claims to increased privileges or were used as shields by the corporations if unpleasant attacks were made upon them. Case after case came into court involving the definition and interpretation of charters. Such rulings as the courts could make were limited in application, for the powers of each charter were so varied that the decisions could apply only to a limited number of corporations and to them, perhaps, only in part. It was the pressure of these technical problems, added to the dissatisfaction arising from the political and financial evils which the special charter system had created, which started the long battle for general corporation laws in New Jersey.

The legislature took the first step in the direction of a general law in the Act of 1846, which defined the general rights thereafter to inhere in every corporation, even when such general rights were not specifically stated in its special charter.[20] The act provided that a company might be incorporated for the length of time designated in the charter, or, if no period were so designated, the corporation should exist perpetually, unless limited by the state constitution. The corporation was to have the right to sue and be sued as if it were an individual. Every corporation might "hold, purchase and convey such real and personal estate

[20] *Laws of New Jersey* (1846), p. 22.

as the purpose of the corporation shall require, provided that such shall not exceed the amount limited in the charter."[80]

One important restrictive provision included in the act reserved to the legislature the power to alter the terms of any charter at its discretion.[81] While this feature was a departure from the custom of the state, it has been included in every charter since 1846 in order to escape the consequences of granting to corporations irrevocable rights and privileges.[82] The folly of such binding gifts was becoming apparent to the people of New Jersey, and while the law could not be made applicable to the charters already granted, the state was determined not to cede such powers in the future.

The second step toward general corporation laws was taken in 1849. The law of 1846 had in a measure given a common basis to all corporations, but it was still the legislature which granted charters or refused them. Whether a proposed company would receive its articles of incorporation largely depended upon its ability to persuade the legislature. The Act of 1849 broke sharply with the traditions of the state, for it took from the hands of the legislators the exclusive power of granting charters to certain specific types of corporations. Thereafter, corporations of the kind designated in the law could be created merely by filing with the secretary of state a declaration of their purpose to incorporate. To quote from the law itself:

> It shall be lawful for any number of persons exceeding four, to associate themselves into a company to carry on any kind of manufacturing, mining, mechanical, agricultural or chemical business within the state, and also for the purpose of inland navigation, upon making a certificate in writing under their hand and seal, setting forth, first, the name of the company; secondly, its place of business; thirdly, the total amount of stock (which shall not be less than $10,000) and capital (at least to the sum of $6,000); fourthly, the names and residences of the shareholders and the number of shares held by each; fifthly, the time the company shall commence and the time it will terminate, which time of life shall not exceed fifty years.[83]

[80] *Ibid.*, p. 20.

[81] *Laws of New Jersey* (1846), p. 22.

[82] M. N. Chanalis, *The General Corporation Act of New Jersey* (Union City, 1929), p. 5, and cases there cited.

[83] *Laws of New Jersey* (1849), p. 300.

Such a certificate of facts sworn to and filed with the secretary of state might be used as evidence against any corporation thought to have violated the terms of its organization, and penalties were prescribed for the signers of false applications. Finally, the legislature reserved the right to dissolve any company which failed to observe the terms of its charter.

This law undertook to protect the people of the state by placing several general restrictions upon the activities of corporations. The general powers of the corporation were the same as those prescribed by the law of 1846. The range of activity of each enterprise, however, was to be interpreted strictly in accordance with its main purpose. Only stockholders were eligible to act as directors, and a majority of the directors were required to be residents of New Jersey. The directors were to be elected by the stockholders, and the main office of the company was to be maintained within the state. An annual statement was to be filed with the secretary of state showing the amount of stock outstanding, assets, debts, etc., with the requirement that the debts should not exceed the capital stock. The latter, however, might be increased merely by filing the amount of the increase in a new certificate. There were no limits placed upon the amount of stock which might be issued.[84]

With these safeguards the requirement for special legislative charters for some kinds of business was removed and the process of establishing certain enterprises was considerably smoothed. Making it possible for companies to receive franchises without having to obtain the consent of the legislature did not, however, remove the power of the legislature to grant special charters if it chose to do so. In fact, the number of corporations securing special charters increased slightly each year until 1865, when there was a great increase in such legislation as a result of several changes in the laws. The amount of special legislation lobbied, forced, and bribed through the legislature reached its high point in 1872, when more than 1,450 pages of the year's statute books were filled with private laws, while the public acts were contained in about 100 pages.[85] The act of 1849, although a step

[84] *Laws of New Jersey* (1849), pp. 300 ff. *passim*. [85] *Ibid.* (1872).

in the right direction, was totally inadequate to eliminate the evil of the special charter system in New Jersey.

In 1865 an act was passed which made possible an immense expansion in the activities of New Jersey corporations. Up to this time, corporation laws assumed or required that the operations of the company chartered would be confined within the state.[36] The law of 1865 released all New Jersey enterprises from such restraint and provided that

> any company organized under the provision of the act to which this is a supplement may carry on a part of its business out of this State; provided that a majority of the persons associated together in the organization of such company shall be citizens and residents of this State.[37]

The law permitted corporations "to own and hold property outside the State, necessary for and consistent with the purposes of the company."[38] This act paved the way for the national expansion of New Jersey corporations.

The political consequences of the special charter system and the privileges it created were enormous. The legislature was subjected to appeals from every side. Privilege-seekers, politicians, and lobbyists, together with those who sought to incorporate legitimate and desirable enterprises, occupied more of the legislators' time than did the public business. Those who had been granted monopolies, tax exemptions, or other favors were bent upon maintaining their privileges against adverse legislation by any available means. The railroad and canal companies saw that their monopolies were unpopular, and that they must secure political control to preserve their exclusive charters and tax exemptions.

Especially was this true of the Camden and Amboy Railroad. That company deliberately set out to control the politics of the state, and it did so thoroughly. Its activities have been summarized by Sackett in the following passage:

> The legislation, proposed for the people, was all scrutinized at the Company's offices in Trenton and allowed to go through if the Company

[36] E. Q. Keasbey, "New Jersey and the Great Corporations," *Harvard Law Review*, XIII, 204.

[37] *Laws of New Jersey* (1866), p. 344.

[38] *Ibid.*, p. 356.

were favorable or indifferent, but its disapproval doomed it to certain defeat. It selected the governors of the State; picked out the men to go to Congress; and named United States Senators. So absolute was its control of all the departments of State government that the State itself became known derisively among the people of other States as the "State of Camden and Amboy." It went into cities and towns and controlled councils and mayors with the same iron hand. It absorbed property of great value everywhere, and, taking it out of the ratables, increased the tax burden of the community from which it was withdrawn. There never was a more complete master of the destinies of a State anywhere than was this master monopoly of the affairs of New Jersey. Its enterprises reached out in a thousand different directions, and there came a time when the State that had taken the corporation to its bosom as a child began to fear it as a master.[39]

The charter under which the road operated guaranteed that no competing railroads should be started without its consent.[40] With this weapon it was able to hold at bay all applications for franchises for many years; then several companies, sometimes by dark and crooked methods, succeeded in buying their way into the state. The Erie, the Jersey Central, the Delaware, Lackawanna and Western succeeded in breaking the hold of the Camden and Amboy sufficiently to secure charters. Yet none could break the Camden's hold on the New York–Philadelphia traffic. That was secure. The geographical position of the road and its tremendous political influence prevented any interference with its privileges. It was finally, in fact, the efforts of a group of New York and New Jersey capitalists bent upon breaking the monopoly of the Camden which brought about the enactment of the general corporation law of the state.

The Camden, by 1867, had expanded and absorbed several smaller roads and had been reorganized as the United Railroads of New Jersey.[41] The company organized by the group of capitalists mentioned in the foregoing, calling itself the National Railroad Company, wished to secure permission from the legislature to build a road parallel to the Camden's line. For some years, however, in spite of every political effort, the National was unable to secure a charter from the legislature.

[39] Sackett, *op. cit.*, I, 12. [40] Cf. *supra*, p. 555.

[41] The new company now owned or controlled 65 miles of canal and 456 miles of railroad. See Raum, *op. cit.*, p. 340.

In 1871, the old Camden and Amboy, or the new United Railroads of New Jersey, was leased to the Pennsylvania for 999 years, on the condition that the latter pay to the stockholders of the former a yearly rent of 10 per cent on the capital stock. Sentiment in the state immediately turned against "foreign corporations." It was felt that the state had passed under influences which would be particularly obstinate and difficult to control. The Camden, known to be corrupt, was to be preferred to a corporation which could only be suspected. Although a legislative investigation which was ordered in 1872 did not report altogether favorably, the purchase was approved by the legislature, March 27, 1873.[42] The people of New Jersey felt that the company had betrayed them and had proved ungrateful for the privileges granted to it. The road which the state had pampered with special favors had now passed into other hands and had taken its favors with it.[43] Railroads which had hitherto been excluded took heart and sought to take advantage of the feeling against the Pennsylvania by securing charters for themselves. The most important of these was the proposed National Railroad.

In the legislative session of 1873 occurred one of the hardest battles ever fought between public interest and private monopoly. The legislators were torn between their fear of political consequences and their avarice. The National Railroad, by choosing a majority of its directors from among New Jersey citizens, capitalized the impulse of state patriotism and finally secured the passage through the House of Representatives of a bill granting it a charter. While this charter was pending, a bill was introduced, known as the Canfield bill, which provided for the incorporation of railroads in New Jersey under a general law. This bill, however, attracted little attention compared to the special legislation sponsored by the National and opposed by the Pennsylvania. The National, capitalized at $7,000,000, offered the state $500,000 for a charter which should include

[42] *Laws of New Jersey* (1873), p. 1298.

[43] It was leased free from all taxation save transit duties. Cf. Raum, *op. cit.*, p. 340.

many of the monopolistic rights enjoyed by its rival.[44] Some of the legislators resented the offer as a bribe; others looked upon it as a sincere effort to pay the state for the benefits it could confer.

The Pennsylvania, fearing that it could not continue to defeat the National's demand for a charter, suddenly began to urge the passage of a general railroad act. It could rely upon its geographic position, its established monopoly, its political influence and special privileges to protect it from all ordinary rivals. If it must have competitors, then better for the field to be thrown open to them all rather than to have the state grant exclusive favors to a rival corporation.

The National, however, continued to press its demand for a special charter. It was not in favor of a general railroad act if it could secure special favors for itself. It did not want monopolies destroyed, it merely wished to be one of the favored few. The results of the battle were doubtful. The Pennsylvania "owned" men in both the Democratic and Republican delegations, and there were a few honest senators who favored the general act rather than a bill granting more special privileges. Enough of these must be "secured" to defeat the National bill, and the Pennsylvania secured them. When the final vote was taken, the triumph of the Pennsylvania was as complete as any of the older victories of the Camden and Amboy. It had again defeated a rival.[45]

But the strategy of the Pennsylvania had been too subtle. In order to divide the forces of the National Railroad, it had urged the passage of a general act which would make it possible for any group to build a railroad at any time. The National, so long as it might possibly secure a special charter, opposed such a bill, but with that possibility gone, it felt that even a charter under a general law was desirable. Quickly the National's support was thrown to that small group in the legislature which had favored the passage of the general act. The Pennsylvania must

[44] Sackett, *op. cit.*, I, 56.

[45] For a description of this legislative session see a graphic and authentic article by Lincoln Steffens, "New Jersey—A Traitor State," *McClure's Magazine*, XXIV (April, 1905), 652.

either continue to support the bill or admit that it had tricked the New Jersey legislature. With the union of these forces, the unobtrusive Canfield bill was pushed through both houses and went to the governor, who eagerly signed it.[46]

Henceforth, any number of persons exceeding thirteen could form a railroad company merely by filing a statement with the secretary of state of purpose, place to be built, and names and residences of the directors. The capital of the company must be at least $10,000 per mile, and not until $2,000 per mile had been subscribed could the company be officially incorporated. If at any time the capital of the railroad was deemed insufficient by the directors, it might be increased by filing a new certificate of incorporation stating the enlarged amount. Capital stock could be issued for expenses of construction and also for buying land, for upkeep, and for operating expenses.[47]

The general corporation laws of the state already provided for manufacturing, mining, chemical, mechanical, and agricultural businesses. The backbone of special privileges had been broken by the general railroad law of 1873. Now it was proposed to go the whole way and by constitutional amendment deny special legislation to all. The proposed measure was drastic in view of the past record, but the legislature was silenced by public opinion. The bill was passed in 1875, was submitted in a special election to the people, and received decisive approval. The amendment provided that "the legislature shall not pass private, local or special laws in any of the following enumerated cases: that is to say: . . . . Granting to any corporation, association, or individual any exclusive privilege, immunity, or franchise whatever."[48]

NEW JERSEY AS THE "HOME OF THE TRUSTS" (1875–1901)

Within fifteen years after the general corporation act had been passed and the state constitution had been amended to prohibit special legislation, New Jersey began to be known as the "home of the trusts." The causes of New Jersey's later at-

[46] *Laws of New Jersey* (1873), p. 88.

[47] *Laws of New Jersey* (1873), pp. 88–90.

[48] *Constitution of New Jersey*, Art. VI, sec. vii, par. 11.

titude toward the corporations go back to the problems imposed upon the state by the early railroad charters which it had granted. In all of these charters the rate and basis of taxation were fixed as a part of the contract. The annual tax for most of the roads, as determined in their charters, was at the rate of one-half of 1 per cent of the capital of the road.[49] In many cases, these charters were irrevocable agreements between the state and the companies. The result of such agreements was that in later years the roads were paying taxes upon the basis of a comparatively small original cost or capital stock. Under such charters, the railroads could add property by purchase, which immediately became tax exempt.

It was the financial problems resulting from this untoward tax situation which caused the legislature to pass the railroad and canal tax law of 1873. This law provided for the taxation of all property of such companies, not used for transportation purposes, at the rate of one-half of 1 per cent for the use of the state, and 1 per cent for local usage.[50] The law failed to specify clearly the methods to be used in assessing the property and provided no basis for differentiating between property used for transportation purposes and that not so used. The assessors often accepted the valuations given to them by the corporations themselves,[51] and the courts allowed a broad interpretation of the phrase "property used for transportation purposes."[52] The law was a failure from the beginning.

The resentment aroused by this situation had been one of the strong forces in the reform movement culminating in 1875. In that year, in addition to providing for general rather than special corporation laws, the voters of the state amended the

[49] This was the rate fixed in the charters of the Patterson Junction Railroad, the Patterson and Fort Lee, the New Jersey, Hudson and Delaware, and the Elizabethtown and Somerville Railroad. The New Jersey Railroad and Transportation Company was subject to a tax of one-fourth of 1 per cent upon the capital stock, and small transit duties.

[50] *Laws of New Jersey* (1873), p. 112.

[51] *Report of the Commission To Investigate Tax Assessments in New Jersey* (Trenton, 1913), pp. 15–16.

[52] See the case of *Camden and Amboy Railroad Co.* v. *City of Atlantic City*, 60 *N.J. Reports*, 242.

constitution to require that "property . . . . be assessed for taxes under general laws and by uniform rules according to its true value."[53]

For several years no notice was taken of the opportunity afforded under this constitutional provision to tax the railroads equally with other property, but as the state continued to sink more deeply into debt,[54] and as the expenses of government constantly increased, more attention was directed toward the matter. By 1882, the slogan of "equal taxation" of railroads with other property had become popular. Charles L. Corbin, a leading corporation lawyer, and George H. Farrier, an assemblyman, among others, secured the attention of Governor Ludlow early in 1883, and poured out such an astonishing array of facts and figures that through him they were able to startle the state with their disclosures. Corbin claimed that New Jersey ranked second among the states in its rate of taxation upon real property, and among the last in the absolute amount of income derived from the total property value. Its debt, too, ranked fifth in size. He asserted:

> No expensive public works have been carried on. No Governor of the State has found the cost of the capitol a painful subject to contemplate in his message. There is no State canal, no Brooklyn or St. Louis bridge, no Hoosac tunnel, no Tweed court house to show for all the millions added to the debt in the last decade. I believe there is not in the entire State of New Jersey a city park ten acres in extent. . . . . The people have been taxed to the limit of their endurance and, in some cases, beyond it, yet the burden continues to increase.

The cause, Mr. Corbin continued, was simply that "more than one-fourth of the property of the State is exempt from local and county taxation."[55]

Assemblyman Farrier corroborated this evidence. He stated that not only did the railroads pay no taxes but that they had acquired large amounts of property not necessarily essential to their business, and that this had become exempt by virtue of its ownership. Each year the railroads amassed more property and

[53] *Constitution of New Jersey*, art. IV, par. 7, subdiv. 12.

[54] The debt in 1879 was $2,096,800.

[55] Quoted by Steffens, *op. cit.*, p. 65.

thus removed it from the tax list. Each year the expenses of the government rose, and hence the burden upon the property left under the power of the taxgatherer grew heavier. Farrier stated that the value of the railroad property in Jersey City alone, exempt from taxation, as reported in the sworn statement of the assessors to the Board of Finance and Taxation, amounted to $19,394,546, or more than one-third of all the property in the city.[56] Each year the railroads of the state escaped two million dollars in taxes which the other property was forced to bear.

In the campaign of 1884, "equal taxation" became the foremost issue. Governor Ludlow became intensely interested in the matter, and, through his speeches and messages to the legislature, did much to arouse popular interest in the abstruse subject of taxation. During the campaign, both political parties pledged themselves to the taxation of the railroads. In the election, Leon Abbett, the Democratic candidate, was successful. As soon as the Assembly met in 1884, bills were introduced into the respective houses of the legislature providing for the taxation of the railroads.[57] The House bill proposed to tax the roads as all other property was taxed. The Senate bill differentiated between the property of the railroads, and proposed to make the property used for transportation purposes subject to the old special railroad rate and to tax all other property at the same rates paid by other owners. This was the bill, known as the Griggs bill, which was finally passed.[58] It was believed that it would add some $300,000 to the revenue of the state.

The new taxation measure improved upon the Act of 1873 in several respects. The property of the railroads used for transportation purposes was to be assessed by a state board of assessors according to definite principles laid down in the act itself. Upon this class of property the state could levy a tax of one-half of 1 per cent upon the assessed valuation, while local taxing authorities could levy taxes not to exceed 1 per cent. All other rail-

[56] Sackett, *op. cit.*, I, 184.

[57] 48 *N.J. Reports*, 146 gives a good summary of these facts.

[58] *Laws of New Jersey* (1884), p. 142.

road property was to be taxed at the same rates paid by other owners in the same district.[59]

The railroads immediately prepared to test the law in the courts. The Jersey Central, after paying its taxes in the fall of 1885, brought suit against the state to recover the amount. The Erie and the Pennsylvania also paid their taxes only upon the condition that the money would be returned if the law were found unconstitutional. Thirty-three railroads were parties to the case which was argued on behalf of them all as the *Jersey Central Railroad Company* v. *The Board of Assessors*.[60] In February, 1886, the Supreme Court of New Jersey declared the law unconstitutional on the ground that it made illegal discriminations in the classification of property owned by the companies.[61] In March of the same year, the case was reviewed and the decision reversed. But even the new decision did not settle the financial problem. The difficulties of assessment and collection were still so great that special legislation had to be passed in 1886 to force the corporations to disclose needed information as to value.[62]

To meet these difficulties the legislature now hit upon the scheme of taxation which was eventually to solve its financial problems. The legislature in 1884 levied a franchise tax upon all the corporations chartered in the state.[63] There was no thought, in adopting the act, of regulating corporations. The law was merely an attempt to provide the state with additional revenue.[64]

Immediately following the effort to tax the railroads, James B. Dill, a young corporation lawyer, came to New Jersey with a

[59] *Ibid.*, pp. 142 ff. Of course this law did not affect those roads chartered before 1846, which were given virtual tax exemption. The act of 1884 (sec. 23) forbade such companies to acquire further property, save that which their charters specifically allowed, unless it first agreed that such property might be taxed. This act of 1884, although it has been amended sixteen times, remains the basis for railroad taxation in New Jersey. The rates also have remained the same. See *Laws of New Jersey* (1919), p. 282.

[60] 48 *N.J. Reports*, 2, 146. [61] *Ibid.*

[62] *Laws of New Jersey* (1886), pp. 403–4.

[63] *Laws of New Jersey* (1884), pp. 233 ff.

[64] Keasbey, *op. cit.*, *Reports of American Bar Association* (1899), p. 390.

scheme to relieve the state of its fiscal troubles. He had previously attempted to interest the politicians of New York in his plan, but that state was not in the financial straits in which New Jersey found herself. The scheme was simple. Mr. Dill proposed that the state should liberalize its corporation laws so as to make them inviting to all aggregations of capital. Then, after inducing the corporations to make their headquarters in the state, a small annual tax could be levied upon the capital stock which would assure the state a sufficient income. It was objected that West Virginia, for example, had liberal corporation laws and that she was not overwhelmed with applications for charters. Here the second part of the scheme came to light. Not only should New Jersey make her laws more liberal than those of any other state, but a corporation should be formed to advertise this fact among the business organizations of other states and to persuade them to come to New Jersey for their charters. It was an unusually auspicious moment to launch the new plan, for no less than nineteen states had passed or were about to pass antitrust laws.[65]

Governor Abbett was persuaded to try the scheme. With a Democratic Assembly behind him, he was able to begin the program of liberalization. An act of 1888 allowed corporations to hold and to dispose of the stock of other companies and made legal the "trust" organization.[66] Other laws followed which enabled corporations to buy stock or other property and to issue their own stock in payment.[67] The purchase and issue of stock should be made upon the facts as they were presented to the directors, and, if subsequent discoveries proved the purchase unwise or even fraudulent, no responsibility should attach to the directors.[68] This enabled any corporation to buy any property it could, pay any price it wished, and to issue sufficient stock to pay for the same.

In 1894, for the first time in thirty years, the Republicans elected a governor and an Assembly. It was thought that they

[65] Jenks, *The Trust Problem*, p. 245.

[66] *Laws of New Jersey* (1888), p. 385.

[67] *Laws of New Jersey* (1891), p. 329.

[68] *Ibid.*, pp. 329 ff. See also *Laws of New Jersey* (1893), p. 301.

might, as a party measure, reverse the corporation program of the Democrats. Mr. Dill's scheme, however, was beginning to be successful. In 1893, the state had collected $434,000 from the corporations, and if the plan were now abolished, some other means must be devised to obtain revenue. Instead of rejecting it, the Republicans systematized the plan. A commission was appointed by Governor Griggs to revise and unify the corporation laws passed in recent years. The remarkable Act of 1896, largely the work of Mr. Dill, was the result. It remained, with but few changes and supplements, the established policy of the state until the passage of the "Seven Sisters" Act in 1913 under Governor Woodrow Wilson.

A brief summary of the law of 1896 is illuminating. Corporations might be formed for any lawful purpose (6).[69] They might carry on their business in any state of the Union or in any foreign country (7). Foreign corporations could hold and convey any property except municipal property (95), although they were not to be subject to the same regulations as were domestic corporations (96). Corporations of the state might merge and consolidate (104), and thereafter should have the rights and privileges of, and should be regarded as, one corporation (106). Consolidating corporations could sell or mortgage any property they might obtain (109). Any corporation not desiring to sell property outright could lease its holdings or franchise to another (133). Taxes to be imposed were upon the capital stock at the rate of one-tenth of 1 per cent of the par value of stock issued up to three million, and five dollars for each one hundred thousand or part thereof above five million (110). This left nothing to the discretion of the tax collector and undoubtedly proved to be an easy and efficient method of taxation.

The powers of the corporations to amend or change their charters were enormous. A corporation could change the nature of its business, change its name, increase or decrease its capital stock, change the location of its principal office in the state, extend its corporate existence, change its common stock into one or more classes of preferred stock, and make any other alterations

[69] *Laws of New Jersey* (1896), pp. 313 ff. Numbers in parentheses refer to sections of the act of 1896.

desired, by a vote of the directors representing two-thirds of the stockholders, provided the amendment could legally have been a part of the original charter (27).

The law of 1896 was, therefore, openly and obviously a bid for the favor of corporations. The state proposed to go into the chartering business, and sought to make its wares attractive. The second part of the scheme, however, was necessary. Corporation trust companies were organized for the purpose of acquainting the corporations of the country with New Jersey's attractive system. The laws of New Jersey required every corporation to maintain its principal office within the state and to keep therein all stock and transfer books. This gave rise to peculiar organizations known as "corporation agencies" or "corporation trusts."

It was the duty of such companies to maintain the "principal office" of a corporation and to care for the stock transfers upon the books. One company could thus maintain hundreds of "principal offices" within one building. The Corporation Trust Company of Jersey City had within its building the principal offices of more than twelve hundred corporations. The New Jersey Guarantee and Trust Company of Camden boasted of more than seven hundred names. In one of its advertising circulars the Corporation Trust Company said:

> We will attend to every detail, including, if you desire, the organization of your company, notify you of all meetings you are required to hold, and see that they are legally conducted. . . . .
>
> We have employees of this office who act as incorporators, who would sign the charter and complete the organization, returning to you all the papers ready to do business in three days. . . . .
>
> The State requires that one director be a resident of this State whom we will furnish if desired without extra charge.[70]

The results of such systematic efforts to attract the corporations were highly gratifying. Early in 1891, a New York newspaper complained that 1,626 corporations had been organized under New Jersey laws in two years. The number and size of the corporations receiving charters continued to grow rapidly.

[70] Advertisements of this type are still to be found in the New York papers. See the *New York Times*, November 24, 1929.

After the revision of the corporation laws in 1896, the great trusts and corporations literally flocked to the state. From January, 1899, to August of the same year, 1,336 corporations with an aggregate capital of more than two billion dollars were organized in New Jersey. Of all the industrial corporations in the United States in 1899 with a capitalization of ten million or more, sixty-one were chartered in New Jersey as compared with sixty in all the other states.[71] Sixty-four of the eighty-five corporations which Mr. Moody calls the "lesser trusts" were organized in New Jersey.[72] One author claims that 95 per cent of the nation's major corporations were, by 1900, chartered in the state.[73]

In 1896, the state collected $707,400 from the tax on the capital stock of corporations, and approximately $75,000 from filing fees. During the same year 834 charters were granted. This number, by 1901, had grown to 2,347 and the filing fees in that year amounted to $687,479.[74] After 1902, the receipts

[71] Keasbey, *Harvard Law Review*, XIII, 208.

[72] John Moody, *The Truth about the Trusts* (New York, 1904), *passim*.

[73] G. H. Montague, *Trusts of Today* (New York, 1904), p. 132.

[74] The first year in which any information can be secured as to the number of charters granted in New Jersey is 1896, but no detailed figures are available until 1901. The following table, compiled from the reports of the secretary of state, shows the growth in the numbers of charters issued annually:

Year	No. of Corporations	Filing Fees
1901	2,347	$687,479
1902	2,350	465,089
1903	2,005	269,147
1904	1,620	147,659
1905	1,912	257,476
1906	2,093	223,181
1907	1,828	135,496
1908	1,649	148,387
1909	2,119	188,059
1910	1,930	142,449
1911	1,855	155,296
1912	1,882	172,738
1913	1,473	123,246
1914	1,279	86,510
1915	1,427	78,023
1916	1,626	115,760
1917	1,514	165,909
1918	1,274	92,053
1919	2,443	236,707
1920	2,588	366,175
1921	2,849	188,944
1922	3,500	451,895
1923	3,718	367,078
1924	4,257	447,936
1925	5,646	396,335
1926	6,109	442,576
1927	6,108	738,447
1928	6,558	653,550

from the corporations never fell below two million dollars, and in 1912, almost reached the three million mark. Such an income enabled the state to relieve property completely from any state tax burden, and as early as 1902, the entire state debt, which had been one of the motives for this wholesale chartering business, had been wiped out.[75]

It was only natural that the attitude of New Jersey toward the large corporations should arouse strong resentment among her sister-states. In 1889, Kansas, Maine, Michigan, Missouri, Nebraska, North Carolina, Tennessee, and Texas passed anti-trust laws of more or less stringency. The federal government passed the Sherman Antitrust Act in 1890 and was soon to bring suit against some of the larger corporations. In the same year, five other states passed similar laws; in 1891, four more states and one territory followed. In brief, by 1914 only seven states did not have laws or constitutional provisions aimed at trusts and unscrupulous corporation practices, and of these the greater part had passed their laws before 1900, when New Jersey was opening her doors to corporations banished from the other states.[76] New Jersey's policy aroused bitter criticism. Journalists began investigations designed to expose the unscrupulous motives and practices of corporations. "Muck-raking" became popular even in staid journals, and publicists tried to outdo one another in exposing the practices of "big business" and in suggesting reforms. Yet New Jersey remained unmoved by the current of public opinion, and every new wave of sentiment against some "trust" made the state more desirable as a haven of refuge to the business interests.

While most of the states strongly condemned the attitude of New Jersey toward the corporations, it was to be expected that some of them should grow envious of her large income, and should undertake to duplicate her program. West Virginia and Maryland began to relax the stringency of their corporation laws. As one authority wrote concerning the policy of another state in the matter:

[75] *Special Reports of the Census, Wealth, Debt and Taxation* (1907), p. 166.

[76] Montague, *op. cit.*, p. 132.

It is not surprising that Delaware should become envious of the increasing stream of gold that is pouring into New Jersey's treasury and take over bodily the latter's corporation act—except that where New Jersey's tax is one-tenth of one percent of all stock outstanding up to three million, Delaware's tax is one-twentieth of one per cent up to five million. . . . .[77]

Maine, also, sought to make her laws more attractive and to compete with New Jersey. But the corporations for a long time were wary of such sudden "camp-meeting" conversions and refused to leave the state where the policy had become stable and of long standing, and where they had been so well treated.

One further consequence of New Jersey's protection to the corporations was the difficulty which other states encountered in controlling corporations chartered there but doing business within their own borders. To quote Keasbey's remarks on the point:

In the report of the Committee of the Senate in New York upon the investigation of "trusts," there was cited as an example, the fact that a combination owning factories in several states, including New York, but without any semblance of any interest in New Jersey, secured a charter there and assumed to carry on its business in New York free from compliance with the beneficial restriction of her laws.[78]

But New Jersey went farther. The laws of 1897 carry the following strange statute:

No action or proceeding shall be maintained in any court of this State against any stockholder, officer, or director of any domestic corporation, for the purpose of enforcing any statutory personal liability of such stockholder, officer or director for any debt, default, or obligation of such corporation, whether such statutory personal liability be deemed penal or contractual, if such statutory personal liability be created by or arise from the statutes or laws of any other State or foreign country.[79]

This law was sheer defiance of the other states of the Union. Lincoln Steffens claimed that the law was passed to protect the officials of the "sugar trust" who were the subject of a legislative investigation in New York. The fact that the bill became law within eighteen hours after its introduction would surely indicate

[77] McReynolds, *World's Work*, September, 1904, p. 2528.

[78] Keasbey, *Reports of American Bar Association* (1899), p. 382.

[79] *Laws of New Jersey* (1897), p. 124.

that it was designed to meet a special emergency. The act remains upon the statute books of the state.[80]

THE ANTITRUST MOVEMENT IN NEW JERSEY AND ITS DECLINE (1901–29)

Opposition to the corporation policy of New Jersey, however, never quite died out within the state itself. The strong evidence, which daily became more convincing, that New Jersey was actually encouraging corporate practices which were being opposed by the other states and even by the national government aroused political reaction within the state. The report on trusts in 1900 of the United States Industrial Commission stimulated the reform movement. After commenting on the fact that much of the corporate corruption of 1899 and 1900 was due to New Jersey's laws, the *Nation* remarked "that these laws—an admitted disgrace and reproach to the State which passed them—would sooner or later be wiped off the statute books was a foregone conclusion."[81]

As early as 1901, the Democratic platform within the state called for trust reform. In 1904, led by George L. Record, a Republican, and Everet Colby, a Democrat, the reform element again tried to break the hold of the corporations. By 1907 the movement, bipartisan in character, had succeeded in pledging the candidates for the governorship in both parties to the enforcement of laws against the corporations.[82] "New Jersey, tired of her bosses, and sick of being called the most corrupt of all the States, was beginning to bestir herself."[83]

With the election of Woodrow Wilson as governor in 1910, the movement for corporate reform attained full recognition. Wilson had declared in his campaign: "I take the three great questions before us to be, reorganization and economy in administration, the equalization of taxation, and the control of cor-

[80] Chanalis, *General Corporation Act of New Jersey* (1929), sec. 132. A second section of this act was declared unconstitutional in *Western National Bank* v. *Reckless*, 96 *Fed. Reports*, 70.

[81] January 23, 1913, p. 91.

[82] W. E. Dodd, *Woodrow Wilson and His Work* (New York, 1920), p. 88.

[83] *Ibid.*, p. 84.

porations."[84] More pressing political matters engaged the legislature's attention until 1912, but in his annual message of that year, Governor Wilson took up the question of the corporations. He said:

> The corporation laws of the State notoriously stand in need of alteration. They are manifestly inconsistent with the policy of the Federal Government and with the interests of the people in the all-important matter of monopoly, to which the attention of the nation is now so earnestly directed. The laws of New Jersey, as they stand, so far from checking monopoly actually encourage it. . . . . These are matters which affect the honor and good faith of the State. We should act upon them at once and with clear purpose.[85]

The direct result of this appeal was the passage, February 17, 1913, of a series of famous acts, known as the "Seven Sisters." The first of these acts undertook to define a trust and to declare what practices would thereafter be illegal. No corporation or combination of corporations was permitted to (1) acquire a monopoly, (2) limit production or increase prices, (3) prevent competition, (4) fix prices. The subsequent acts repealed laws authorizing holding companies. Corporations were forbidden to buy stocks of competing companies with a view to controlling them. Price discriminations, save those based on quantity and quality of goods, transportation or other valid charges, were forbidden. Corporations might issue stock for property or goods, but the property must be the full equivalent of the money value of the stock. All violations of these laws involved personal liability for the directors and officers of the guilty corporations and a penalty of a fine or imprisonment or both might be imposed.[86]

It is impossible to determine the exact effect which these laws had upon the corporations of New Jersey. Within two weeks of their enactment, Governor Wilson was inaugurated as president, and the state soon relapsed to its more liberal policy.

[84] Quoted by H. J. Ford, *Woodrow Wilson: The Man and His Work* (New York, 1916), pp. 127–28.

[85] *New Jersey Legislative Documents* (1912), I, 4.

[86] *Laws of New Jersey* (1913), pp. 25–34 *passim*. See also Nathan B. Williams, *Laws on Trusts, and Monopolies, Domestic and Foreign* (Washington, 1914).

There is little to indicate that the state or the corporations suffered particularly from the provisions of the "Seven Sisters" acts. In 1912, the year before the acts were passed, 7,935 corporations paid the state $2,529,029. In 1913, 8,434 corporations paid $2,578,716.[87] It is true that the number of charters issued from 1913 to 1915 declined,[88] but there are good reasons to believe that this drop was materially affected by other than legal causes.

An act of 1915 materially amended that portion of the "Seven Sisters" acts which related to the rights of corporations to deal in the stocks of other companies.[89] The first of the acts of 1913 was repealed outright in 1917,[90] and the other acts of the series, if they had not been amended previously, proved futile, for they were aimed at the trusts which the first act had defined.

The wave of sentiment for corporate reform has receded since its height in 1913. Other economic and political topics engage the public mind. The corporation laws of New Jersey in 1929 resemble very much the laws of 1896.[91] Such differences as do exist are those gradually evolved by time and changing economic views. The policy has remained almost constant.

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[87] Sackett, *op. cit.*, II, 365.

[88] See the table in the preceding.

[89] *Laws of New Jersey* (1915), pp. 181–83.

[90] *Ibid.* (1917), p. 568. [91] Chanalis, *op. cit.*, *passim*.

INFLUENCE OF THE GOLD CAMPS ON THE ECONOMIC DEVELOPMENT OF WESTERN MONTANA

UNTIL the opening years of the sixties the chief influences upon the development of western Montana were the Indian trade, the missionaries, and some agricultural settlement incidental to a greater migration into the more distant parts of the Oregon country. All of these factors continued to operate through the sixties and seventies, but they gradually became less important and were overshadowed by another influence, that of placer gold-mining. Gold had been discovered in California in 1848, but the gold rushes into what may be called the interior of the far Northwest did not begin until the late fifties, when the output of the California mines was falling off. The heyday of placer mining in California was over, and many of the old experienced miners from there were in the van of the mining development of this new region, which thus received an influx of population from the West as well as from the East.

The rapid development which took place would not have been possible had it not been for the existence of better transportation facilities after 1862. Steam navigation of the Missouri and the Columbia and the connection of the two water routes by the Mullan Road took place independently of the needs of the mining immigrants and for the most part preceded the mining exploitation. Adequate transportation was at first more a cause than an effect. Better communication was partly the result of the fur trade and the agricultural emigration to Oregon, but probably the chief motive which actuated the War Department in constructing the Mullan Road at this time was to facilitate the movement of troops and supplies in the event of war with Great Britain, which was possibly imminent as the result of a boundary dispute.[1] The road was begun in 1859 and completed in 1862. It connected

[1] William Joseph Trimble, "Mining Advance into the Inland Empire," *Bulletin of the University of Wisconsin*, No. 638, "History Series," III, No. 2 (1914), p. 38.

Fort Benton on the Missouri with Walla Walla, and its total length was 624 miles.[2] Steam navigation on the Missouri to Fort Benton was established in 1859, and at about the same time the Oregon Steam Navigation Company, having secured control of the portages at the Cascades and The Dalles on the Columbia, established its system of navigation for some 300 miles eastward to Wallula. From here it was less than 50 miles overland to Walla Walla, where connection was made with the Mullan Road. The

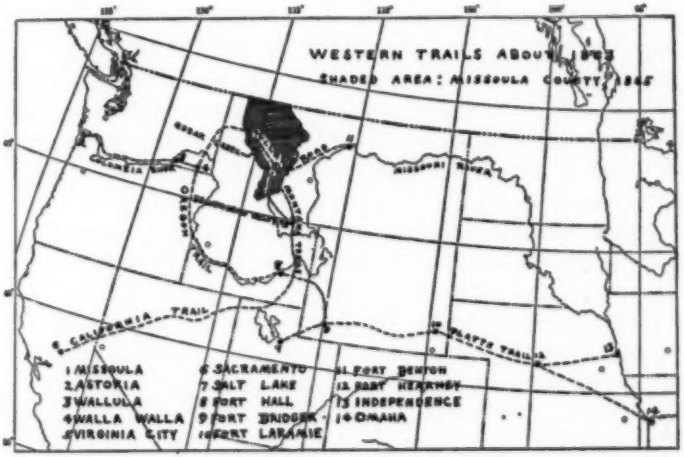

FIG. 1.—Western trails about 1863

Oregon Steam Navigation Company also put boats on sundry remote navigable waters, notably on a portion of the Clark's Fork of the Columbia and on Lake Pend d'Oreille. This made it possible to do away with a portion of the land haul over the Mullan Road in what is now Idaho.[3]

Gold was actually found in Montana as early as 1852, but it was the discovery on Gold Creek in Hell Gate Canyon in 1862 by Granville Stuart and his companions that started the tide of im-

[2] Captain John Mullan, "Report on Military Road" (1863), *Senate Executive Document No. 43*, Thirty-seventh Congress, Third Session, p. 37. See map, Fig. 1.

[3] See Trimble, pp. 126–27; also Poppleton, "Oregon's First Monopoly," *Quart. of the Oregon Hist. Soc.*, IX, No. 3, 274–304, cited by Trimble.

migration to Montana probably twenty years or more before it otherwise would have come. Gold had been discovered on the Salmon River in what is now northern Idaho in 1861. By 1862 there was a rush to these mines, some of the immigrants coming from the east via Fort Benton and some coming from Colorado through the Deer Lodge Valley, but all proceeding westward via the Mullan Road. These immigrants, influenced by Stuart's discoveries, prospected in Montana, and in August, 1862, discovered gold in the Beaverhead Valley in what is now southern Montana between the headwaters of the Clark's Fork and the Missouri. Bannack City came into existence in the winter of 1862–63. That winter still richer deposits were discovered in Alder Gulch a few miles to the east, and Virginia City was born. There was a rush to Montana from Oregon, California, Colorado, Minnesota, and the states bordering on the Missouri River. It is estimated that there were from 10,000 to 15,000 people in Alder Gulch in 1864 and 30,000 in Montana, the greater part of them attracted by the lure of gold. Some came from the East, but many were a backwash from the California diggings.[4]

The six years following the discovery of gold in Alder Gulch in 1863 witnessed a succession of wild rushes in the quest for gold—Last Chance, Silver Bow, German Gulch, French Gulch, Confederate Gulch, Bear Gulch, Little Blackfoot, Gold Creek, Nevada Creek, Elk Creek, Lincoln Gulch, and doubtless others the names of which are not remembered. But the gold camps which had the most direct influence on western Montana were those at Cedar Creek, which rises in the Bitter Root Mountains and flows into the Clark's Fork of the Columbia about 65 miles west of Missoula.

Gold was discovered in Cedar Creek October 9, 1869, by Louis Barrette and his partner, one B. Lanthier.[5] It was their intention

[4] See address by W. F. Sanders, in *Contributions to the Historical Society of Montana*, IV, 122–48.

[5] Mr. Will Cave, secretary of the Montana Historical Society, published a series of articles on early Missoula history in the *Sunday Missoulian*, Missoula, Montana (1923). Unless otherwise credited the factual material concerning the town of Missoula in the seventies, especially the story of Cedar Creek, is summarized from these accounts and from oral statements of Mr. Cave, corroborated by others who were present at the time. The writer visited the Cedar Creek area in 1924.

to keep the strike a secret until the following spring, but the news leaked out and a stampede followed. The winter continued exceedingly mild with less than an average snowfall, a fact which probably prevented many tragedies. Late in the sixties a rush of California miners had poured into the Idaho diggings and peopled the valleys on the west side of the Bitter Root Mountains. The trails from here radiate into Cedar Creek, and probably the majority of the stampeders came from these camps to the west and northwest, though there was a sprinkling of adventurers from the East.

Beside the ground which Barrette had taken as the "Discovery" claim, there is a sort of shelf on the mountain side. On this shelf was built the town of Louisville. Several who were residents of the town estimate that at one time in 1870 there were 3,000 men living there. Looking over the ground today, one would say that there is not room for 300. The late Judge Frank H. Woody states, "This camp drew a great many men to it and in the Spring of 1870 it contained an estimated population of 1,500 persons."[6] It is probably true that at least 3,000 men came in and went out of Louisville during the summer of 1870, and there may have been as many as 10,000. Perhaps more than half the men who reached the camp, finding the ground practically all located, immediately went elsewhere. It has been asserted that there were in Cedar Creek more expert placer miners than had ever before been brought together in one mining camp. These men appear to have been on the whole of a very high type, which was not the case in some of the earlier camps. Few women came to Cedar Creek, probably not more than twenty.

In the spring of 1871 the center of activity had pushed up the creek, and the town of Forest City was built at the head of the canyon. Will Cave mentions other small settlements in and near

[6] The late Judge Frank H. Woody came to western Montana in 1856. He wrote an article entitled "Early History of Missoula County," which appeared in the *Weekly Missoulian*, Missoula, Montana, July, 1876. The same material was used later by Judge Woody for an article entitled "Sketch of the Early History of Western Montana," which was published by the Historical Society of Montana in Vol. II of the *Contributions of the Historical Society of Montana*, Helena, Montana (1896), pp. 88–106. Much of the local data about events up to 1870 used here has been derived from this account.

the vicinity of the gold strike. The last year of big returns for the "drifters" was 1872. But the miners pushed on up the creek so that in the winter of 1872–73 the business houses were moved another half-mile, and the town was called Mayville, while old Forest City became another deserted town. The summer of 1873 found the drift diggings pretty generally worked out, though paying well to the end. But by fall they were finished for single operators, and numbers of miners were seeking wealth elsewhere. By the middle of the seventies the camp was a thing of the past so far as placer mining was concerned. As to the amount of gold taken out of Cedar Creek, Judge Woody in 1876 estimated that the district had produced something more than $1,000,000.00. Others have placed the estimate as high as $7,000,000.00.

With the termination of the productivity of the gold diggings, the temporary cities which had grown up about them passed away almost as rapidly as they had risen. Virginia City, Bannack, Louisville, Forest City, and many smaller ones became ghost towns. But other centers—Missoula, Deer Lodge, Bozeman, Spokane, and similar places—had arisen as the product of trade. There was little or no manufacturing development in them. Their business consisted in the importation of manufactured goods and the distribution of these in the immediately surrounding country in exchange for the products of the extractive industries in the region. The means of transportation were sufficiently good to make this business possible and profitable, but they were not cheap enough to make it possible to haul the bulky local products of relatively low value for a very long distance and permit large scale concentration and distribution in some one center which could become the metropolis of a large region. Each little district had its own commercial center. The most important town in western Montana was Missoula. It was located on the Mullan Road at the confluence of that highway with the trails from the Bitter Root, Flathead, and Blackfoot valleys. Missoula may be taken as a type of town characteristic of intermountain settlement.

During the winter of 1864–65 the trading firm of Worden and Company erected a sawmill at the place where Missoula now

stands. The sawmill was on the north bank of the river, and power was furnished by water carried to the mill by means of a ditch from Rattlesnake Creek. As soon as the mill had produced sufficient lumber for the purpose, Worden and Company constructed a grist mill just east of their sawmill. Thus not only was lumber available for building purposes, but the grist mill made it possible for the farmers to dispose of their grain. The farmers exchanged their grain for supplies, frequently by direct barter. Worden and Company made the grain into flour, some of which was sold back to the farmers, but the greater part of which was sold to miners and immigrants. In the spring of 1865 the handful of pioneer traders that was gathered in a little village called Hell Gate a few miles west of the Missoula mills on the Mullan Road moved in a body to the present location at Missoula.

The little town was on the natural route for travel between the gold camps and the settlements in the West. The stores at Missoula[7] benefited by the trade in outfitting miners. Hundreds of men passed by on their way to Alder and other gold strikes to the east. The Kootenay gold mines across the Canadian border were discovered early in the spring of 1864. These stampedes created a demand for all kinds of supplies, and everything sold at high prices. The settlers in the Gallatin, Jefferson, and Madison valleys added to the demand for seed grain and potatoes. The ruling price for wheat was from $4.00 to $5.00 a bushel, but Judge Woody says that seed wheat sold as high as $10.00 a bushel and potatoes for $6.00 a bushel. Yeast powders sold for $1.50 a box and coffee for $1.00 a pound. Flour of the poorest quality sold readily at $30.00 a hundred pounds. The currency at this time was mostly gold dust, as there appears to have been little money except gold which came in from the mines.

Missoula County was created as a part of Washington Territory in 1860 and re-created as a part of Montana Territory in 1865. The county commissioners, complying with a petition signed by sixty-four persons, located the county seat at Missoula in 1865. The minutes of the county commissioners for February 6, 1866, contain this item: "The assessment of all taxable prop-

[7] Before 1865 they were located at Hell Gate.

erty in Missoula County ordered at special session of October 16, 1865, is hereby postponed until the necessary blank forms and instructions will be received from the territorial auditor."[8] This is interesting in view of a statement by Judge Woody: "From 1863 to 1866 were the halcyon days of Missoula County; money was plentiful, produce of all kinds sold at war prices, with the demand exceeding the supply. No taxes, no license to pay, and our county free from debt!"

One Major William Doney, who came to Missoula, December 25, 1867, described it as follows: "It wasn't much of a place when I came to it that Christmas day. There were two stores and a hotel besides the Missoula Mills and the few houses that had been built for the folks who started the town. But there was more in Missoula in the way of employment than there had been anywhere else that I had visited . . . . that winter."[9] Minute as the village was, its economic importance was out of all proportion to its size.[10] The town provided a market where the farmers could sell their products, and the mill provided a place where wheat could be ground. Missoula became the place where the trappers and traders, the farmers and miners could get their supplies, and there were no rival places in the vicinity.

That the Cedar Creek mines had a very important effect upon Missoula is indicated by the growth which took place at the time they were at their height. By 1870 there were sixty-six occupied buildings, half of which had been built since 1869. Will Cave, speaking of the population in 1870, says, "I should estimate somewhere near three hundred. . . . . Missoula was the point of most considerable consequence in Western Montana." He also speaks of 250 persons being at a Christmas celebration in the early seventies. The first bridge across the Hell Gate River was built at Missoula in the summer of 1869. This bridge was swept away by high waters in 1871, but another bridge was completed in 1873. A courthouse was finished in 1871 at a cost to

[8] Unpublished document: "Minute Book of the Clerk of the Board of County Commissioners, Missoula County," p. 7.

[9] A. L. Stone, *Following Old Trails*, p. 198. Published by M. J. Elrod, Missoula, Montana, 1913.

[10] See Trimble, *op. cit.*, pp. 111–12.

the county of $15,600.00, and a stone jail was built at the same time costing $7,000.00. These buildings were not, however, as elaborate as their costs might indicate. Taxes were not very carefully assessed or collected, and there were no cash funds available for building purposes. Consequently payment was made by means of county warrants which could be sold for only 25 cents on the dollar, a fact which the contractor took into consideration. The first newspaper published in western Montana was issued in 1870. It was a weekly called the *Missoula and Cedar Creek Pioneer*. Subsequent to the founding of Missoula in 1865, sites for building purposes began to have a value. By the seventies residence lots sold for prices ranging from $10.00 to $50.00, and business lots ranged in price from $100.00 to $150.00 depending upon location. There was no appreciable increase in land values in the town until after the coming of the railroad in 1883, when the town was incorporated. In 1872 there were all told six stores, including a grocery and shoe store, a variety store, a drug store, a hardware store, and two general merchandise stores.[11] There were also two hotels and four saloons. Eddy, Hammond and Company, the largest of the general stores, branched out with a half dozen or more stores in the Bitter Root and Flathead valleys and engaged in wholesale as well as retail merchandising. By 1880, in spite of the depression, this firm was doing a total business of $15,000.00 a month.[12]

The fact that the region was not self-sufficient was characteristic of all the mining area and was one of the chief factors contributing to the rapid rise of the towns. There were only a few basic products, and as far as western Montana was concerned only one which went to the outside world, namely, gold. In the Gallatin Valley and elsewhere in Montana, the great sheep and cattle ranchers had those products to export, but this does not apply to the Missoula district to any great extent. Missoula itself was not even a producer of gold. The existence of the gold camps

[11] According to statements of Mr. Will Cave and others who were residents of the town at that time.

[12] From unpublished statement of Mr. C. H. McLeod, general manager of the Missoula Mercantile Company, successor to Eddy, Hammond, & Co., by whom Mr. McLeod was then employed.

stimulated agricultural development by providing a market for farm products, but the transportation facilities were not sufficient to get these products into any wider market. The miners had one product, gold, with which they had to buy all their supplies. The farmer was somewhat more self-sufficient, particularly in the matter of food, but except for flour and lumber there were no local manufactures which the farmer or miner could buy. All manufactured supplies had to be brought into the country. Hence the favorable position of the merchants, especially those located at a strategic distributing point such as Missoula. The farmer bought his supplies with his surplus food products, including wheat, and with cattle and horses, practically all of which were destined for the mining camps or for the town itself, which thrived upon the trade. The significance of this became very apparent when the gold camps began to disappear.

Today one might wonder by what means and from what points provisions and supplies were brought to the miners. Supplies often came from the West rather than from the East. This was partly because the San Francisco houses were experienced in making miners' supplies and were more up to date in producing mining equipment than the eastern houses. But the movement from the West was also due to the fact that many of the lighter articles of freight, such as tea, some woolens, etc., could be carried more cheaply from the West than from the East. Freight could come by water for nearly 300 miles up the Columbia River to Wallula and thence by pack train via Walla Walla to Missoula. For the lighter freight this route was not only feasible, but it was cheaper than the one from the East because of the cost of hauling by wagon over the mountainous and muddy road from Fort Benton. In the summer, however, when navigation of the Missouri was open, Chicago, Omaha, and St. Louis had an advantage over San Francisco in making heavy freight shipments. These could then be carried by water at a relatively low cost to Fort Benton and forwarded from there by wagons drawn by oxen. For heavy freight this was cheaper, even over the bad road from Fort Benton, than the route by pack train from Walla Walla. Goods came from as far east as Chicago, being shipped overland to the Mis-

souri River ports, thence up the Missouri to Fort Benton, and over the Mullan Road to Missoula. This route was used to some extent until the coming of the Northern Pacific Railroad in 1883, but after the completion of the Union Pacific in 1869 freight from the East was more likely to be shipped by rail to Ogden, Utah, from there by wagon to Deer Lodge, and thence down the Hell Gate Canyon to Missoula. The goods brought in from both east and west included all sorts of miners' supplies, machinery, tools, tobacco, liquor, nails, clothing, tea, coffee, and smoked, canned, or preserved foods; in short, manufactured goods of all kinds. As far as goods from the West were concerned, Missoula participated in the trade with the camps to the east. As to goods from the East, it was possible for freight coming in from Fort Benton or Ogden to be carried by wagon over the Mullan Road through to the mouth of Cedar Creek, instead of being unloaded in Missoula and reshipped by pack train. But this was far from practicable. Missoula was the natural forwarding point. After the first 20 miles west of Missoula, while the road was passable for light wagons, it was impassable for heavy ones, especially oxtrains. In fact, the high grades were not only difficult to overcome but in places exceedingly dangerous. There is one point which is nearly 1,000 feet above the river and the road is very steep, even for a mountain road. This was the heyday of the pack trains, principally mule trains. These trains numbered usually from forty to sixty packs, although there were several that numbered more than one hundred. A first-class pack mule could carry 400 pounds weight. These trains were on the road continually when the condition of the trails permitted, and were the chief means of transporting merchandise over the mountain trails.

The charge for the transportation of goods by wagon was 1 cent a pound for about 100 miles. Goods were brought from Deer Lodge to Missoula by wagon for $1.00 a hundred pounds. Sometimes in the summer freight was brought in from Deer Lodge for as low as 75 cents a hundred pounds. The rate from Fort Benton to Missoula, a distance of about 265 miles, was never less than 3½ cents a pound, and was usually about 5 cents a pound. The main divide of the Rockies lies between, and there were some

muddy roads, which accounts for what appear to be exceptionally high rates even for wagon carriage. Rates were usually somewhat higher by pack train than by wagon. The rate was 4 cents a pound from Walla Walla to Missoula, about 300 miles. Thus a pack train of thirty-five mules, each carrying 400 pounds, earned $560.00 for a trip from Walla Walla to Missoula. Charges for the transportation of supplies from Missoula to the gold camps were made at corresponding rates.

The freight that went from Missoula to the camps, both by pack train and by wagon, included, besides the supplies which had been imported from a distance, agricultural produce which had been bought by the Missoula merchants from the ranchers in the vicinity. These food supplies consisted of eggs, peas, potatoes, and other vegetables, meats, hay, and grain, etc., as well as flour milled from local wheat. It does not appear that any of these products were shipped out of what is now Montana and Northern Idaho. A little wool went out via Fort Benton, and cattle and horses from this vicinity were driven out via the Mullan Road, but for the most part Missoula was not a distributing point to very distant markets.

It will be convenient at this point to mention some of the legislation under which the public domain was disposed of in the Missoula district. The public domain was originally acquired by the United States government through claims based upon exploration and occupation and by treaty with the Indians, and it has been disposed of under authority given by various acts of Congress. It is only the alienation of the land which ultimately came into agricultural use which will be considered, as the forest lands as such did not become significant until later. A series of pre-emption laws beginning in 1830 and ending with the Pre-emption Act of 1841 were designed to protect the squatters who frequently went out into the wilderness and settled on the land long in advance of surveys. The pre-emption laws protected the squatter in the improvements which he made by giving him a prior right to buy the land at $1.25 an acre after he had resided upon it for six weeks. All of the land taken up by settlers in the vicinity of Missoula before 1862 was pre-empted in this way. The Homestead Act of

1862 gave outright a tract of 160 acres to any head of a family who would cultivate it for five years. The Homestead Act came just in time to advertise further the agricultural possibilities of the far northwest, to which attention was already being directed by the mining development.

Some scattered land was taken up in the vicinity of Missoula, but much of the country was heavily wooded and unsuitable for agriculture until it was cleared. The Flathead-Jocko Valley was an Indian reservation, and its agricultural land was not open to settlement until much later. Most of the agricultural settlement before the coming of the railroad was in the Bitter Root Valley. Practically all of the land here which was acquired by settlers was purchased under the Pre-emption Act of 1841, as Congress had failed to repeal that law when it passed the Homestead Act of 1862. After the building of the Northern Pacific Railroad, the minimum price was raised to $2.50 an acre for land within 40 miles of the railroad, this being one of the conditions of the railroad grant. This grant, made in 1864, gave to the railroad alternate sections for 40 miles on each side of the right-of-way. A large part of the western Montana land in this grant was forested, but that which was not could not compete with the government land except at the same price. The richest land open to settlement was in the Bitter Root, and the settler hastened to buy it outright, either from the railroad or by pre-emption, rather than homestead it.

One is inclined to think of the Montanans of 1865 as miners and traders only, but even then there were men who were farming, and the prices of farm products were good in those days. The meadows in the valleys, particularly the Bitter Root Valley, were selected as places in which the early stockmen could winter their stock. There were possibly 150 individual agricultural settlers in Missoula County in 1866.[13] When one considers that Missoula County comprised nearly all of western Montana and that settlers had been coming in since 1856, this does not seem like a very

[13] At this time the county included practically all of the region which is the subject of this study. Since then the counties of Lincoln, Flathead, Sanders, Lake, Mineral, Ravalli, and part of Powell have been carved out of Missoula County. See map, p. 581.

rapid rate of agricultural growth. And indeed it was not. But it must be remembered that whatever agricultural settlement there was in Montana previous to the gold rushes was merely a small trickling in of settlers incidental to a much greater migration into the country farther west. The Oregon Trail was 200 miles south of western Montana, and of course the great bulk of the emigrants never saw that region at all. But a few choosing by chance the route down the Bitter Root Valley remained there instead of going on. From what can be learned now it seems that those who came in via Fort Benton were really on their way to the Oregon country farther west, although Montana may have been the deliberate destination of a few, influenced perhaps by the tales of the trappers.

It was the overflow from the gold camps which gave the first important impulse to agriculture in the valleys. A considerable number of miners remained in western Montana. When they were disappointed in getting a claim, or when they had made a stake, they drifted out into the country and began taking up land. This influence was noticeable in western Montana as early as 1865, and was very marked by the time of the strike at Cedar Creek. Some went to the town of Missoula to take part in the growing trade. It is probable that the greater proportion of the male population in western Montana, prior to the advent of the Northern Pacific Railroad, had at some time or other sojourned in a mining camp. Grist mills on the Burnt Fork of the Bitter Root, at Fort Owen, at French Town, and at Missoula were all operating in 1870. Settlement in the valleys went on apace and all of the ranches in the immediate vicinity of Missoula were fenced by 1871. According to the census figures, the population of Missoula County was 2,554 in 1870, but it must have actually greatly exceeded the census figures at this time, or soon after, as the gold seekers were a floating group and there are known to have been several thousand at the Cedar Creek mines alone.

Before the influence of the gold camps began to be felt, practically the only product which was sold was wheat, and with this the settler bought his supplies, consisting of clothing, tools, and a few foods such as tea and coffee. The settler was practically self-

sustaining so far as most of his food was concerned. Of fuel and building material he had an abundant supply in the forests, but there was no lumbering except to supply local needs. The lumber that was sawed at the mill in Missoula was all for local building purposes. That many of the miners of 1870 turned to agricultural pursuits is indicated by the census figures on agriculture, which show a marked increase in the decade 1870–80 for Missoula County.[14] The number of farms in 1870 is not known, but there were 211 in 1880, and the acreage in farms increased from 15,827 to 41,969, of which 19,746 acres were improved land. The value of the land increased but slightly, from $6.09 an acre to $6.89 an acre, but the value of all farm property increased from $261,000.00 to $551,000.00. Substantial increases are shown for all kinds of live stock. There were but 156 sheep in 1870, and the census gives 100 pounds as the amount of wool produced. Doubtless more wool was produced to be used as homespun and not marketed, although the number of sheep is probably nearly correct. In the spring of 1880 the number of fleeces shorn was 1,476, yielding 8,724 pounds of wool, all of which was doubtless marketed. Nearly 20,000 dozen eggs were produced in 1879, all of which must have been marketed or they would not have been counted.

The cattle produced in the vicinity of Missoula, mostly in the Bitter Root Valley, were a relatively minor part of the great ranch cattle industry. This industry centered in the Gallatin Valley. But since cattle-raising was such a characteristic phase of the economic development of the state as a whole, it is worth while to give some idea of the proportions of the industry. The first report of the territorial auditor states that there were 1,769 head of sheep, 4,325 head of oxen, and 1,896 cows and calves returned for assessment purposes in 1865. It is probable that herds of stock cattle were first brought into Montana from Texas as early as 1865. The first beef driven out of Montana for market of which there is any record was in 1868 when J. D. Hogan, of Augusta, drove a herd to the Salt Lake market, where they were sold

[14] Figures on population, products, acreage, etc., taken from United States Census of 1870 and 1880 unless otherwise indicated.

for meat to the contractors along the Union Pacific Railroad. The first shipment by rail was in 1874, when a large herd was driven overland from Montana to Ogden, Utah, where they were loaded and shipped east.[15] The great cattle "drives" from Texas and other southern states into Montana came, for the most part, between 1869 and 1889, and were at their height in the early eighties.[16] In their annual reports the territorial governors estimate 500,000 driven in in 1881, 100,000 in 1884, and 200,000 in 1885. The considerable unexplained variations lead one to believe that these estimates are not very accurate.[17] The rise of the sheep industry and its conflict with the cattle industry is still another phase of the ranching epoch in the economic development of Montana. But this is not a matter with which this history is concerned. In the vicinity of Missoula, sheep- and cattle-raising were not conducted on an open-range basis to the extent that they were in the Gallatin Valley and elsewhere in Montana. The great cattle kings and the wool-growers were east and south of Missoula. The ranchers in the Bitter Root Valley operated on a smaller scale.

Less than 1,000 tons of hay were produced in Missoula County in 1869, as compared with more than 5,000 tons in 1879, and in the same decade the cereal production increased from 60,000 bushels to 326,000 bushels. The United States Census figures show that the value of all crops increased from $140,000.00 to $165,000.00, the relatively small increase in value as compared to the increase in volume of production being due to the decline in prices. The fact that figures are shown giving the amount of production of peas, potatoes, and other vegetables, as well as eggs and other items, bears out the statement that the settlers were fairly independent of the markets, but at the same time the quot-

[15] *Montana Farm Review*, Vol. I, Joint Bulletin of the United States Department of Agriculture and the Montana State Department of Agriculture, Helena, Montana (1922). See pp. 21–24 of this bulletin for an interesting summary of the Montana livestock industry.

[16] *Anaconda Standard*, April 6, 1922.

[17] See also Clarence Gordon, *Report on Cattle, Sheep, and Swine*, Monograph on Meat Production in Tenth Census of United States (1880), III, 67–74.

ing of figures at all indicates that there was a market even if prices were low and times were dull by 1879.

The Missoula National Bank was organized, April 5, 1873, with a capital of $50,000, one Captain Higgins being the chief promoter. This was the first bank of any sort in Missoula, and the capital was all local. The name of the bank was changed later as well as the ownership, but the bank itself has had a continuous existence since 1873, and is today the oldest national bank in Montana. From items in the minute book of the bank it seems to have done a thriving business from the first. The rate of interest was 2½ per cent a month in 1875.[18] It made loans to Missoula and Cedar Creek merchants. There is no evidence that the security was anything other than the personal credit of the borrowers. The credit was used to help finance merchandising transactions, but it does not appear that it was customary to take chattel mortgages on stocks of goods. The old-time banker knew his man—or thought he did. It would be interesting to see the bank's financial statements for these early years, but they are not available.[19]

Of the capital which came into the West much was invested in mining and agriculture, but a considerable part went into trade in towns such as Missoula. And the two latter forms of investment were the more permanent until after the quartz-mining began. The surplus was invested in further development. The merchants, saloon-keepers, etc., brought in stocks of goods when they started in business, but the *growth* came out of the resources of the immediately surrounding region. In a sense, then, little

[18] In going over the old records of the bank, the writer came across a bundle of unpaid notes, with 1875 dates, and bearing this rate of interest. There may have been a connection between the high rate and the fact that the notes were unpaid, but other records indicate that this was at that time not an unusual rate of interest. Overdrafts seemed to be the rule rather than the exception, especially in the accounts of the bankers themselves. In examining the customers' ledger of those early days, the writer noticed whole pages almost entirely in the red. Overdrafts totaling as much as $75,000 were not uncommon.

[19] These records were locked in an old vault in the basement of the bank. The foundation had settled and the door could not be opened! Published newspaper reports are not available for years previous to 1890 and government reports do not contain separate information for Missoula.

outside capital came in before the time of Marcus Daly.[20] Even the bank was organized with local capital. Later on this lack of outside capital was to be a retarding factor, but it seems that at this time the capital was sufficient for this stage of development.

Wages in the seventies averaged about $40.00 a month, with board for unskilled labor such as ranch hands, teamsters, etc. The wages of hired labor in stores ranged from $60.00 to $100.00 a month, the latter figure usually representing a salary paid to the holder of a position involving some executive work. Hired labor in the mines was on a much higher scale. Wages in the Cedar Creek mines ranged from $6.00 to $8.00 for a twelve-hour day. It must be understood that all of these prices of labor are quoted on a gold basis. During the period from 1862 to 1878, when depreciated paper was in circulation in the East, this region was using specie only. As a matter of fact, the prejudice against the use of anything but "hard money" persisted until comparatively recent times. Although wages in the West were moderate, they were somewhat higher than in the East, especially as wages in the East were paid in depreciated greenbacks. This fact, coupled with the labor discontent in the East because of the discrepancy between the rise of prices and wages, was undoubtedly a cause contributing to the westward migration, since the prospective emigrants were likely to overlook the still higher prices of commodities in the West. However, it is doubtful if this was a cause of much migration to Missoula, although it was probably of some importance at Cedar Creek.

Before 1870 the only way of sending or receiving letters was by means of the express messengers. With the growth of mining, they found their way into the most remote camps and carried letters at $1.00 each. At first this work was done by independent

[20] Marcus Daly came to Butte originally in the interests of Walker Brothers, Salt Lake City silversmiths and capitalists. In 1876 he opened the Anaconda Hill at Butte and acquired a one-third interest in it for himself. The great body of copper ore in this mine was discovered in 1882. Under Daly's leadership the Anaconda Copper Mining Company emerged, in the eighties, as the dominant mining interest in Montana. This company acquired investments, particularly in timber and the lumber industry, all over western Montana.

individuals, such as David Chamberlain and Joaquin Miller.[21] The romantic adventures of these pioneer pony-express riders comprise some of the most interesting tales of early Montana. But the business was soon taken over by Wells, Fargo, and Company, which by the middle sixties was sending its messengers into every part of the mining regions. It does not appear that any regular mail service reached Missoula before 1870, although the mining camps to the east had United States mail service earlier. Beginning about 1870 the mail was brought from Corinne, Utah, via Deer Lodge, to Missoula and Cedar Creek. This service was irregular at first, but later there was a triweekly mail stage between Deer Lodge and Missoula. On alternate days the mail was brought by cart, so that the town had a daily mail service by the middle seventies. But for freight services it was still obliged to depend upon wagons drawn by oxen.

By 1875 the placer gold-mining camps had played out entirely or were rapidly disappearing, the Indian trade had passed its peak, and a period of cessation in development, lasting for five or six years, set in. The Indians had been given annuities and had removed to reservations, and with the coming of settlement the fur-bearing animals fast disappeared. While white hunters and trappers still brought in furs, the business had become relatively unimportant. The miners had drifted out of the country or had turned to agricultural pursuits. A brisk market for agricultural products was therefore not available. It was a period of "hard times," but it is not possible to trace any very intimate connection between the conditions in Missoula and vicinity and the general hard times in the seventies. Indeed, western Montana was too anxious to get a railroad on any terms to feel any great amount of sympathy with the granger movement. Western Montana was not yet a silver-producing region and received no benefits from the Bland-Allison Act. But the community favored free silver because of the anticipated effect on prices, and Montana was Republican at this time, not only because of the wool-growers, but also because it was the Republican party which was

[21] See Joaquin Miller, *Illustrated History of Montana*, chap. x. Chicago: Lewis Pub. Co., 1914.

flirting with free silver. The silver question was soon to become a matter of great significance in western Montana, but it seems that the dull times of this period were simply the result of the cessation of gold-mining activity and the dwindling of the Indian trade.

The local products which were brought to such little trading centers as Missoula were relatively few in number and all of an extractive character. In the early days it had been furs; then it was gold which came into the little towns. Both of these products, being very valuable for their bulk, were exported out of the country. Gold-mining, as we have seen, reacted to bring about agricultural development, and the towns thrived upon the resulting trade, but the farm products did not go farther than the gold camps. Wool and cattle from some parts of Montana did indeed reach distant markets but only at relatively great expense. As far as the trading towns of western Montana were concerned, their markets were the gold camps. Consequently, when the latter passed out of existence, the towns had lost their *raison d'être*, except in so far as they could be supported by the agricultural communities. Missoula, for example, had reached a stage typical of frontier settlements. It had enjoyed a growth up to this time resulting from trade built upon the distribution of manufactured goods to mining camp and farm, and of farm products to mining camp. But the imported commodities had been bought with gold, and now the flow of gold had ceased. The agricultural development of the valleys was sufficient to hold together the commercial community for a while, but this support could not continue long because the farmers no longer had a market. The high cost of transportation precluded the shipment of their products for long distances.

The mining camps of the sixties and early seventies had attracted an enormous floating population and had acquainted the people of the United States with the Rocky Mountain region. The movement of population into this area had been for the most part a spontaneous response to the lure of gold. It had occurred without any stimulus on the part of the government; indeed, it frequently took place in spite of all the intentions of the govern-

ment and multiplied its problems, since the United States was obligated by treaties to preserve these lands for the Indians. The pressing need for a transcontinental railroad through this section became increasingly apparent. "Yet the mining camps had served their purpose in revealing the nature of the whole of the national domain."[22]

The region was a producer of extractive products. When there was a market these industries flourished and so did the trade in supplying the producers with consumable commodities. The natural resources were rich, and the more they were exploited the more trade grew. The "booster" type of citizen and the "boom" type of town became typical of the West. When times were good profits were enormous, but the depression was just as characteristic of the West as the period of prosperity had been. The remaining mineral wealth of the country could be exploited only by capitalistic methods, and these were feasible only with adequate transportation facilities. With these provided, new mines would come into existence, the timber resources would be in demand, agriculture would be stimulated, and trade would revive. Meanwhile the region languished. In the case of Missoula, one thing which helped to tide over the dull years before the coming of the railroad was the expenditure of government money incidental to the establishment of a United States fort there. This was only one in a long chain of government activities which were to become an increasingly important factor in stabilizing trade in Missoula and minimizing the effect of periods of depression. As a rule, the frontier settlements had few such stabilizing factors. When the market was good for extractive products, producers, traders, and speculators prospered, and, to paraphrase slightly, when times were good they were very good indeed but when they were bad they were horrid.

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[22] Frederick L. Paxson, *The Last American Frontier* (New York: Macmillan Co., 1910), p. 173.

THE NEW CONCEPTION OF THE "STANDARD OF VALUE"

A NOTED historian writes:

> "Problem" and "fact" are the names of the two great poles between which all human intellectual activity moves. What we do not yet feel to be a fact we call a problem; what we no longer feel as a problem we call a fact. But just as every problem tends towards melting into a fact, so every fact secretly tends to take refuge in becoming a problem, again. . . . .[1]

This statement applies with particular force to the question of the standard of value and its operations today. It is erroneously assumed, in many current discussions of the standard of value and of stabilization of prices, that gold is that standard today as it always has been in days past. If, however, one traces the evolutionary changes in the standard, it can easily be demonstrated that this is far from the truth even though the gold dollar of 25.8 grains 9/10 fine remains the pecuniary unit of accountancy and of price reckoning. That is, price is expressed in dollars and cents because these monetary units have been legally established. A standard monetary unit is synonymous with a symbol or sign when used to express prices. But this instrument of pecuniary accountancy must not be confused with the valuation process underlying price quotations, and into which the operations of a standard of value enter. If viewed from this angle, gold is not today the standard of value. The evolution of the credit system has come to a point at present where credit has supererogated the functions of money.[2] Indeed, the powerful incursion of credit has also displaced the use of capital funds to a large extent and over considerable periods. That is to say,

[1] Egon Friedell, *A Cultural History of the Modern Age*. New York: Alfred A. Knopf, 1930, I, 149.

[2] By money is meant specie, i.e., gold and silver, or certificates representing these, plus greenbacks not covered by gold, and perhaps also in the case of the United States, national and federal bank notes, since some state banks may hold these as reserves.

funds can be created by commercial banks on the basis of their customers' credit, which funds are added to the existing supply of capital funds—new savings and old, and these bank-created funds serve the business borrower in the same manner as capital funds. Furthermore, there is evidence that we have, permanently outstanding, an increasing volume of bank-created funds which are not liquidated by savings or new capital funds accumulation.

Is it not fair to ask whether our conception of a standard of value, and of its operation, is in accord with reality? What do we mean by "value," or by the thing which we call the "standard"? How do we explain the assumed relation between the operations of a "standard of value" and "prices" in the actual economic and business world of today? By what methods, employed at what time and place or point in the business system, should control of prices and of the standard of value or its operations be exercised? Perhaps a genetic approach and development of the problem may throw some light upon these problems.

A true standard of value could be expected to function effectively only provided its operations were brought into an organic relation with valuation processes as they actually occur. Erroneous ideas of the operation of a standard of value result when a certain quantity of gold is assumed to be the standard unit, an entity alien to production processes in the economic and industrial world in which values are created. The gold standard of value has only a distant or indirect relation or connection with factors which determine valuation. The evils resulting from the gold standard are well known. An economic and business system which is subject to that standard may be overstimulated over short or long periods, or may be overdepressed for similar periods, because of the variability of the standard. It deranges the operations of our acquisitive society, injects undue risks and uncertainty into the economic process, renders business calculations difficult and often impossible, leads some business entrepreneurs into costly errors, and others temporarily into green pastures of differential advantages. More fundamentally, it engenders a constant shifting and reshifting of wealth and often

a devastating maldistribution of wealth. In the business world it spells confusion, in the social world injustice.

Obviously, a definition of money would vary from country to country and from time to time within a country, because its forms have varied greatly throughout monetary history. The definitions of money made by the classical economists were reached at a time when the use of credit was still in its infancy. According to these definitions, money performed four functions, namely, (1) as a medium of exchange, (2) as a standard or measure of value, (3) as a standard of deferred payment, and (4) as a store of value. But what has happened to these functions imputed to money during the progressive evolution of the credit system into the state of credit hegemony which obtains today? Credit has appropriated the medium-of-exchange function of money almost completely. Gold and silver are held in the coffers of banks. We find use for other money only as token coins. Naturally, with the expropriation of the medium-of-exchange function by credit, the function of gold as a standard or measure of value, in the old sense, has also disappeared. In its other functions as standard of deferred payments, and as store of value, money has also lost most of its earlier significance. Since credit funds have become the predominating media of exchange, payments of credit contracts are as a matter of course executed by means of checks drawn on bank deposits. Only in a few long-time bonds (not including those specifying payment in an equivalent of gold) are there stipulations to pay in gold, and these often at the option of the creditor, who rarely exercises the right, except perhaps in the case of foreign creditors during periods of abnormal foreign exchange markets. As to money as a store of value, rare is the individual today who regards hoarding of money as a good business proposition. True, in times of financial stress, such as occur during panics or in periods of such rampant currency inflation as occurred in Europe after the war, there are attempts by individuals to secure specie money, but this is uncommon. For the most part, the business world, at any rate, relies upon credit. But while business men depend upon credit, and economists recognize its importance, both tend still

to reason in terms of a money or gold standard, when, as a matter of fact, the automatic operation of the standard-of-value function of money, chiefly of gold, appears to have been thoroughly superseded by the actual standard-of-value function of the credit dollar.

Money as a medium of exchange, as reckoned by the "cash" or money in circulation or in banks, is a very small fraction of the total media of exchange in use. But while the influence exerted on the credit system by the shifting of a marginal amount of money between banks and the public on account of seasonal variation in need for money in circulation, or, what is more significant, the gradual decline of money in circulation because of a growing use of checking deposits by individuals, must not be overlooked, nevertheless, it is to be emphasized that money has to a significant extent lost to credit its function as a medium of exchange.

With the passing of all the classical functions imputed to money, what functions are left to it, or rather, has money, from an evolutionary standpoint, acquired new functions? Yes, the transformation has been gradual, and in conjunction with the development of banking and its functions and operations money is performing more and more, and with increasing exclusiveness, a most significant purpose. In the present system of business economy, money, or gold, functions through bank reserves as a regulator of expansion and contraction in credit operations and of business equilibrium within the limits of expansible bank funds. Money as a regulator of bank reserves and therefore of credit operations, sets the limits to expansion of elastic bank credit and to some degree to its contraction. That is, money functioning through bank reserves regulates the limit up to which credit funds may be created, and therewith acts as a check upon the standard-of-value function of credit funds. Within the limits of elastic bank credit, money functions through the shifting of bank reserves or funds based on these reserves; this shifting, resulting from the relative degree of expansion of bank credit between banks, or areas, and in conjunction with relative price movements or price displacements, aids in keeping business

in a dynamic equilibrium. In this respect, it aids in keeping the credit standard of value relatively equal between industrial areas. This principle of operation in the function of money in international relations, where money consists of gold, has long been recognized. Through national reserves, gold has functions in limiting credit expansion and price movements, as well as in serving to bring about an equilibrium in business activities between nations. But even here, international credit operations are to an increasing extent superseding gold.

Money today, therefore, exerts only two indirect influences upon the function of the credit dollar as the standard of value: (1) it sets a rigid maximum limit to the creation of bank funds through credit, and it plays a part in limiting the extent of contraction, and (2) it regulates business equilibrium between these limits restricting the disparities in the use of bank credit funds. Since the function of a medium of exchange in the realm of production is almost entirely performed by credit, it is therefore the actual operating standard of value. This renders the old conception of money as a standard of value untenable. Gold is not in modern times in organic relation or in operational contact with the real factors in production and distribution of goods and services. In short, it is a thing apart, not indigenous to the exchange processes in the economic and business world; its relation to production and exchange of wealth is exceedingly remote and indirect.

With the standard-of-value function passing to credit, a different understanding of the term is necessary because its functional aspects have altered. The real question now becomes: What is the standard of value of the credit dollar or the dollars making up the credit funds? Credit is the power to obtain goods, services, or funds on time. It is taken for granted that confidence is present and that legal safeguards have been provided, and, also, that the terms of credit transactions are couched in the written forms of credit and security contracts. The power underlying credit consists of potential or dormant purchasing power (an abstraction), a quality attached to the possession of productive wealth, such as, land, buildings, plants, machinery,

materials, location, managerial abilities, etc., an *ensemble* of tangible and intangible objects and qualities. The possessor can convert this purchasing power into funds by means of resale, by productive use, or by using credit. The funds so procured may be old or newly accumulated savings—capital funds, or funds created by banks on the basis of credit—but in either case the borrower undergoes an evaluation of his credit power by the lender if he seeks to use his "credit." This often becomes a bargaining process between lender and borrower. The former engages in a credit investigation, or analysis, or makes an investment analysis, if long-term credit is desired. The purpose is to determine the degree of credit power possessed by the prospective borrower. This power is reckoned on the basis of such factors as productive abilities, physical possession of production equipment, and past earning power. This brief sketch seems commonplace, but it is retold in order to bring home the idea that credit and investment analyses are undertaken to develop satisfactory criteria which can serve as a basis for judging or measuring the credit power of a prospective borrower. It is the fundamental purpose of investigations into the credit worth of debtors to establish the criteria as to what the standard of value for the credit dollar in terms of productive capacity shall be. That is, credit analyses must determine whether funds are to be injected or removed from circulation. This is tantamount to saying that the key to a stable standard of value applied to dollars of credit funds lies in the credit extension policies of banks. Bank-credit policies become the primary as well as vital subcontrol of the value of credit media of exchange, because the decision of bank credit departments and loan and discount or investment committees form the primary basis for the inception or withdrawal of funds in circulation. Instead of the standard of value being an arbitrary unit of gold it becomes the measured productive power of a borrower, as it should be.

Credit testing and judging, however, deal with one element difficult to measure, namely, the fact that credit power includes valuation in price terms; that is, the instrumentalities of production must be and are reckoned in terms of price. Here the

question arises—should original costs, reproduction costs, or capitalized value of earnings be taken? This question is not so disturbing as another, What is the earning capacity in terms of prospective profits? In this aspect of credit and investment analyses, prices and marketing conditions external to the prospective borrower come in for consideration. Inclusion of this factor in the credit judgment which serves to provide a measure of the volume of credit dollars to be issued affords the basis for the necessary supercontrol of the credit standard of value logically lodged with the central banks. The function of central banks is to take a macroscopic view of the so-called credit conditions on the basis of a variety of data relating to price trends, production, trade, etc. The policies thereupon inaugurated, aiming to stabilize business conditions, result in a further control over the standard of value of credit funds, and an attempt to keep the value of credit funds upon an even keel. Unfortunately, banks and central banks are still forced, in view of the lingering influence of money reserves, to have regard for the relation at various times between the quantity of credit funds in use and the gold or money reserve.

The problem now calls for a new conception of the term standard of value: a standard of value for our fund of credit dollars, or the credit dollar as distinguished from the gold dollar. The standard, or measure, is sought in credit and investment analyses of credit power or capacity, indicating that the lenders, especially banks, hold the key to the situation—both from the standpoint of judging the credit power as well as of being in control of the primary points where credit funds are injected into circulation. "Value" in the newly formulated conception becomes associated with productive capacity, or the instrumentalities and agencies which create value. Credit policies, and more particularly bank credit and investment policies, should be regarded as primary factors in the control of the exchange power of credit funds through rigorous and efficient application of sound rules for credit extension, if sound criteria upon which a relatively invariable standard of value for the credit dollar may be administered are to be developed.

We have seen how central banks may operate as organs of supercontrol, keeping the general conditions as even as possible through their policies, thereby making it easier for the banks generally to judge the earning capacity or the prospective profit factor as an element in credit power possessed by the client. A banking system co-operating harmoniously in regard to credit policies as outlined would leave central banks in a merely passive position, except that they must guard the reserves which law and custom still invest with a lingering importance—like a loyal canine guarding the grave of a dead master. Perhaps the day will arrive when the central banks will be converted into a governmental administrative and regulatory body in the field of credit, similar to the Interstate Commerce Commission or the Federal Trade Commission.[3]

This interpretation of the modern problem of the standard of value must also recognize an intermediate factor which is important in the question of controlling the standard of value of the credit dollar. It lies in the realm of financial and business policies of industrial and commercial concerns. One must not assume that business enterprises are or have been negative elements, nor that they always need to be chastised by banks for requesting more credit or capital funds than they are entitled to. Besides, business corporations possess large funds in their own right. However, by adequate planning based on reasonable

[3] It may be asked: In controlling the "credit standard" do not the banks also incidentally control the gold standard? Is not equilibrium between the two necessary? Does not the credit machinery now determine what shall be the level of gold value rather than ignore, or make unimportant, that value? The writer's answers to these questions are: (1) If banks do control such a thing as the "gold standard" they do so inadvertently, for the existence of gold is almost entirely foreign to their daily dealings, and (2) the necessary equilibrium can therefore not be attained and is only present in periods when the limit of elastic bank credit expansion has been reached and to some extent in periods of credit contraction, and (3) the implication of these questions is that the gold "standard of value" is effective, which is here denied, except in so far as gold in bank reserves functions to limit the creation of bank funds and, within the limits of expansion and contraction of credit operations, facilitates the equilibration of business activity. It is only at these points that gold enters the picture at all. Within these limits credit funds operate with relative freedom from gold and have their exchange power or value determined by banking policies and credit analyses with possible consequences, independent of gold, in price movements.

market forecasts, they should produce a less variable standard for the exchange value of credit funds. In addition, through accounting procedure, sound valuation of balance-sheet items, and a careful adjustment of balance-sheet valuation with income, should greatly aid in developing a program required to make the credit dollar a stable dollar in its exchange power.[4]

It is already recognized in many quarters that gold or reserve money has now merely a regulatory function through bank reserves. Whether or not this function will sooner or later be frankly viewed as a "vestigial organ" cannot at present be forecast with certainty. Clinging to the traditional conception of gold as a necessary standard of value and continuing to press policies into effect through our system of institutional control based upon this conception may lead us unnecessarily into a period of economic hardships in the light of the gold situation both at present and in the future. Should we not resolutely face the realities of the current setting of the standard-of-value problem and seek to adopt policies for administering it in accord with the realities of the actual situation?

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[4] Compare the writer's article in *Corporate Practice Review*, June, 1930, "Price Changes and Index Number Accountancy."

SOME ASPECTS OF MEXICAN IMMIGRATION

THE migration of Mexican laborers to the United States is a phenomenon of major significance in our historical development. It has coincided in time with political and economic insecurity in Mexico, and with war labor shortage, restricted European immigration, and expansion of intensive agriculture in the United States. In numbers this migration compares with the migration of Irishmen stimulated by potato famine; by reason of racial, class, and cultural factors, its importance transcends that of the earlier migration, and of contemporary immigration, which is greater in numbers but in which these elements are less involved. The purpose of this article, however, is not to engage in a general discussion of Mexican immigration. Its scope is limited to the presentation of data which measure the penetration of Mexican labor in two widely separated areas, and in selected units of three basic industries—transportation, steel manufacturing, and meat packing.

I

Maintenance of way of our railroads has occupied newly arrived immigrants of many nationalities, both European and Asiatic. Lack of skill or of facility in the English language have been no bar to employment, and the railroads have always demanded large numbers of common laborers. The seasonally fluctuating character of the demand and its wide geographical dispersion have contributed to keeping a large part of the labor supply in a state of fluidity. Like other immigrants, many Mexicans have entered American economic life by this traditional route. They, and their compatriots in seasonal agriculture such as cotton, sugar beets, fruits, and vegetables, are the most mobile element of our national labor supply.

Although employment of Mexicans for maintenance of way began in the Southwest in the closing decades of the last century, they have been used during and since the war on a number of eastern railroads as well as in the West.[1] As early as 1917 and 1918, for example, the Pennsylvania Railroad brought from the Southwest two or three thousand Mexicans. Their numbers have been so reduced, however, that on its

[1] On the use of Mexican labor by railroads in Chicago and vicinity, see Paul S. Taylor, "Employment of Mexicans in Chicago and the Calumet Region," *Journal of the American Statistical Association*, June, 1930, p. 206.

lines east of Altoona, where most of them outside of Chicago are found, there were reported to be not more than 253 employed in August, 1926. The Baltimore & Ohio Railroad, too, and perhaps other railroads, brought Mexican laborers east at about the same time as did the Pennsylvania; but within a few years most of them went to other industries in the East, or back to the Southwest. Chicago, however, has become an important center out of which Mexicans are shipped extensively for work on railroads both east and west, particularly on extra gangs during the summer.

The principal railroads employing Mexican track labor have been, and are, those which operate west of Chicago and have lines which tap the Southwest. Table I shows the changes in race[2] of common track laborers on nine western railroads which have occurred during a period of approximately two decades. The data for 1909 are those of the United States Immigration Commission.[3] In that year the Atchison, Topeka, & Santa Fe already employed over 98 per cent Mexican labor on its lines west of Albuquerque. The Mexicans reported by the Southern Pacific at that time were about equal in number to those reported by the Santa Fe on its western lines, and probably were concentrated mainly south and east of Los Angeles. Among those reported as "Mexicans," there were doubtless some born in the United States; but then, as now, the great majority were from Mexico.

Figures for 1928–29 were obtained by the present writer through the courtesy of the railroads, which in every case but one secured the data by means of a special census; in that case, race, which proved to be practically 100 per cent Mexican, was ascertained by examination of names on the pay-roll. Data for both 1909 and 1928–29 cover the same lines or portions thereof. The months for which they were secured vary as between railroads from April to July; but for each railroad, data were obtained as of the same month in both 1909 and 1928–29, in order to minimize the effects of seasonal fluctuation. Figures for one railroad, employing about 30 per cent of the 1928–29 total number of employees, were obtained in 1929; figures for the others were obtained in 1928. It is believed that no important variation is introduced by this difference in year. A very few foremen, comparatively negligible in number, may be included in the 1928–29 data. Because of non-uniform reporting in 1909, perhaps a few score, or even hundreds, of Greeks were included with Italians; Greeks and Italians, not to exceed forty,

[2] "Race" as used by the United States Immigration Commission.

[3] *Reports*, Part 25, III, 7.

were included as miscellaneous whites; and American whites were not completely separated from miscellaneous whites. Only the last of these defects interferes with clear determination of trends. For this reason American and miscellaneous whites have been combined in Table I; in 1928–29, of the 12,020 thus classified, 9,853, or 82 per cent, were reported as "Americans."

It will be observed that the total number of employees was larger in 1928–29 by practically 10 per cent than it was in 1909. No deduction

TABLE I

CHANGES IN RACE AMONG COMMON LABORERS IN MAINTENANCE OF WAY DEPARTMENTS OF NINE WESTERN RAILROADS BETWEEN 1909 AND 1928–29*

RACE	1909		1928–29	
	Number	Percentage	Number	Percentage
American and miscellaneous white	10,944	31.3	12,020	31.3
American colored	.....	.....	481	1.3
American Indian	35	0.1	149	0.4
Chinese	406	1.2	119	0.3
East Indian	73	0.2	1	.....
Filipino	.....	.....	287	0.7
Greek	7,653	21.9	767	2.0
Italian	5,941	17.0	1,337	3.5
Japanese and Korean	3,895	11.2	384	1.0
Mexican	5,972	17.1	22,824	59.5
Total	34,919	100.0	38,369	100.0

* The railroads, or portions thereof, and dates of reporting in both 1909 and 1928 or 1929 are: Southern Pacific, May 1; Atchison, Topeka & Santa Fe, west of Albuquerque, May 31; San Pedro, Los Angeles & Salt Lake, July; Union Pacific, July; Oregon Short Line, May 31; Denver & Rio Grande, July 1; Oregon Railroad and Navigation Co., April; Northern Pacific, west of Paradise, Montana, June 1; Great Northern, Spokane and Cascade divisions, July.

as to trend is warranted, however, since the apparent increase may be due to temporary fluctuation or other interfering factors; new construction, such as double tracking or acquisition of feeder lines, may have increased the actual track mileage maintained, even though the reports for both periods are from the same administrative divisions.

Since 1909, American and miscellaneous white employees have increased numerically and have held exactly their 1909 proportion of the total. Greeks, Italians, Japanese, and Koreans, important in 1909, have greatly diminished both absolutely and relatively. The decline in Japanese is probably even greater than appears, since in 1909 during the months of this report many had left for seasonal work in sugar-beet fields. The few Chinese have become fewer, and of East Indians

there remained but one. The northward migration of Negroes and the entry of Filipinos into the Northwest are reflected in the appearance of a few of both of these races in the figures of 1928–29. The number of American Indians has increased, but they remain both absolutely and relatively unimportant.

The principal change has been the great increase in employment of Mexicans. These have risen from approximately 6,000 to approximately 23,000, or from 17.1 per cent to 59.5 per cent of the total. Mexicans are now in the places which in 1909 were occupied largely by Greeks, Italians, and to a lesser extent Japanese and Koreans. The table reveals by cross-sections the ebb and flow of the tides of migration passing through this occupation. It shows in detail the results at this bottom level of the slackening and restriction of European immigration, the exclusion of Oriental immigration, the drift of older immigrants to other occupations, and the immigration of Mexicans, unrestricted until 1929.

II

There is some disposition to regard Mexican immigration as a regionally limited phenomenon. The foundation for this attitude is the concentration of Mexican population in the four border states of the Southwest. But in the same way, the Negro population is concentrated in the old South; yet large numbers have been detached from the South and, by migration, are building up important Negro colonies in many parts of the United States where not many years ago Negroes were seldom seen. The Mexicans are as free to move as the Negroes; indeed, their employments, seasonal in nature, compel them to move. In the long run, there is probably about as much, but no more, reason to regard the Mexican population as confined to a region than the Negro population.

Indeed, the Mexicans have already appeared on the sugar-beet farms and in the cities of the North.[4] And in another article I have presented statistics showing that Mexicans were employed by railroads and other industries in the Chicago-Gary region.[5] Analysis of those figures reveals that Mexicans first appeared in numbers on the railroads during the war. With a lag of but a year or two they were found in im-

[4] On the migration of Mexicans to sugar-beet fields of northeastern Colorado, see the study by the present writer, "Mexican Labor in the United States: Valley of the South Platte, Colorado," *University of California Publications in Economics*, Vol. VI, No. 2 (1929).

[5] See above, n. 1.

portant industrial plants, their numbers on the railroads locally continuing to rise at the same time. A peak number of Mexicans in both railroad and industrial employment was reached in 1920; it was followed in 1921 by a sharp recession to 28 per cent of the number employed on the railroads in 1920 and to 37 per cent of the number reported by the industrial plants. The Mexicans were obviously the last hired and the first fired in general depression. Recovery and then advance in number of Mexicans in both employments marked 1922 and 1923. Despite some downward fluctuation, there has been a generally upward trend since that time, until at least 1928 or 1929, both absolutely and relatively.

A comparison between the migrations of Mexicans and of Negroes to the industries of the Chicago-Gary region is of interest. To provide data contributing to such a comparison, figures on the annual employment of both races by two steel plants and two meat-packing plants are presented here in Table II.[6]

Data on employment of Mexicans in the steel plants commence with 1916, when Mexicans first appeared as a separate group in the plant nationality reports. This date is practically the beginning of employment of Mexicans in the steel industry of the region. The United States Immigration Commission reported no natives of Mexico in the iron and steel manufacturing industry of the Middle West in 1909.[7] Such adventurous persons as the Mexican in Lackawanna, New York, who told me in 1929 that he had been employed at McCormick Works, Chicago, in 1913, were numerically inconsequential.

Data on Mexicans in the packing plants begin with 1917. Nationality was determined by examination of names on a mid-summer payroll of one plant for the years 1917–19 and of the other plant for the years 1917–22; subsequent figures on Mexicans in both plants are from plant nationality reports. Any Mexicans employed in these plants before the dates shown in the table were numerically negligible. Indeed, of 15,489 employees in the Chicago slaughtering and meat-packing industry on whom data were obtained in 1909, only one was a native of Mexico.[8]

Data on Negro employees in the steel plants are taken from nationality reports. One plant reported 7 Negroes employed in 1910 and 8 in 1911, but the plant employing nearly all of the 266 Negroes in

[6] These four large plants were among those from which the statistics referred to above (p. 612, and n. 1) were obtained.

[7] *Reports*, IX, 17. [8] *Ibid.*, XIII, 204.

1912 had on file no nationality reports prior to the latter date. In iron and steel manufacturing in the Middle West only 62 Negroes were reported by the Immigration Commission in 1909, or 0.5 per cent of the 12,053 employees for whom data were obtained.[9] These data, therefore, reach back close to the beginning of employment of Negroes in the steel industry of the region.

TABLE II

NUMBERS AND PERCENTAGES OF MEXICAN AND NEGRO EMPLOYEES IN TWO STEEL PLANTS AND TWO MEAT-PACKING PLANTS OF THE CHICAGO-GARY REGION

YEAR	TWO STEEL PLANTS					TWO MEAT-PACKING PLANTS				
	Mexicans		Negroes		Total Employees	Mexicans		Negroes		Total Employees
	Number	Percentage	Number	Percentage		Number	Percentage	Number	Percentage	
1912	.....	.....	266	1.5	17,441	.....	.....	.....	.....	.....
1913	.....	.....	112	0.9	12,693	.....	.....	.....	.....	.....
1914	.....	.....	70	0.7	9,964	.....	.....	.....	.....	.....
1915	.....	.....	196	1.1	17,265	.....	.....	.....	.....	.....
1916	18	0.1	558	2.9	19,490	.....	.....	.....	.....	.....
1917	33	0.1	1,274	5.5	23,140	7	*	**	.....	20,901
1918	104	0.5	1,546	6.7	23,073	78	0.3	**	.....	27,254
1919	142	0.7	2,699	13.4	20,112	79	0.3	**	.....	23,642
1920	283	1.3	2,580	12.1	21,365	266	1.5	5,110	27.8	18,361
1921	49	0.4	1,375	10.0	13,780	82	0.6	2,928	20.3	14,460
1922	313	1.6	2,901	15.0	19,403	86	0.7	4,236	32.7	12,952
1923	1,205	6.0	2,761	13.8	19,985	482	3.2	5,148	33.6	15,311
1924	1,749	7.9	3,438	15.5	22,118	711	4.8	4,840	32.4	14,956
1925	1,866	8.5	3,105	14.1	22,052	644	4.7	4,244	30.6	13,851
1926	1,895	9.1	2,678	12.9	20,762	612	4.5	4,068	29.6	13,748
1927	1,819	8.8	2,568	12.4	20,723	596	4.5	3,864	29.0	13,317
1928	2,081	9.4	2,716	12.3	22,061	746	5.7	3,894	29.5	13,194

* Less than one-tenth of 1 per cent.

** Data available for one plant only: 1917, 1,466; 1918, 1,624; 1919, 1,710.

Data on Negro employees of the packing plants are historically much less adequate. As early as 1909 the Immigration Commission reported 462 Negroes employed in the slaughtering and meat-packing industry of Chicago, or 3 per cent of those for whom data were secured.[10] The figures presented here are taken from nationality reports, except that for the years 1917–22 data from one plant were obtained from a mid-summer pay-roll by a method which gave accurate results.

Mexicans appeared later than Negroes in both steel and packing plants, as is shown in Table II. Numbers of Mexicans were transported

[9] *Ibid.*, IX, 17. [10] *Ibid.*, XIII, 204.

from the Southwest by steel manufacturers, a fact which largely accounts for the greater numbers and proportion of Mexicans found in steel than in packing. By 1928 Mexicans comprised 9.4 per cent of total employees, and Negroes had declined from a peak of 15.5 per cent to 12.3 per cent. Negroes, on the other hand, were transported North by meat packers, which accounts for the different situation found in their plants in which nearly one-third of the employees in 1928 were Negroes and about one-twentieth were Mexicans. In both industries, for the five years ending with 1928, there has been a small shift in relative proportions of Mexicans and Negroes, the former rising and the latter declining. But over a ten-year period or more, both groups have increased greatly both in numbers and in proportion to total employees. It is clearly the "whites" who have been replaced during this longer period.

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BOOK REVIEWS

The Public Control of Business. By DEXTER M. KEEZER and STACY MAY. New York: Harper & Bros., 1930. Pp. xi+267. $2.25.

Taking their cue, ostensibly, from that portion of President Hoover's inaugural address devoted to the relationship between American government and American business, Messrs. Keezer and May have produced an interesting, valuable—and irritating—study of Supreme Court decisions affecting government regulation of industry. Three methods of control—antitrust laws, public-interest regulation, and government competition—are considered, and an attempt made "to present an orderly picture of how each procedure was inaugurated in the United States, how it has developed, and what limitations, if any [the authors are prolific in their disclosures of such limitations], have been placed upon its use by judicial decisions." Limitations upon regulation other than those imposed by judicial action are, however, given slight attention, and the intrinsic merits of the three methods of regulation are not analyzed or weighed. These restrictions on the scope of the book tend somewhat to impair the reader's grasp of the full import of the judicial decisions under consideration.

In the minds of the authors, much of the effectiveness of the antitrust laws has been "given away" by the courts: "Judicial interpretation . . . . has had the effect of legalizing almost any degree of concentration of economic power if certain legal formalities are observed." The Supreme Court, by holding that mere size does not constitute illegality, while restraining small independent firms from acting in concert, has actually encouraged the formation of large consolidations. Similarly, with respect to the control of unwholesome business practices, the courts have blocked anything in the way of measurable accomplishment. Intelligent action in this field must wait until objective criteria of the relative desirability of combination and competition are made available in concrete cases; this eventuality has been removed indefinitely into the future by the hyper-technical attitude of the courts in construing statutory provisions purporting to grant investigatory powers to the Federal Trade Commission.

Turning to a study of the "continuous and positive" control applied

to businesses affected with a "public interest," the authors disclose that the enterprises deemed by the Supreme Court to belong in this group "fit no legal or economic category," and suggest that the Court's emotional bias with respect to price regulation is really the determining consideration. Moreover, within this field, the courts have seriously crippled effective control through excessive restrictions upon regulatory powers in the matters of rate valuation, supervision of operating expenses, and control of wages. These limitations suggest the "ultimate" procedure—government participation in industry as owner and proprietor. Strangely enough, the Supreme Court "has placed no judicial limitations upon the power of the government to expand its activities in this direction," in spite of the fact that by this means "the government can regulate and even destroy private industry." "In the light of economic analysis, an examination of the decisions . . . . in antitrust, public interest, and public ownership cases would seem to indicate that the Court has strained at the gnat and swallowed the camel."

Following an excellent chapter on "the vexing problem of federal and state jurisdiction," the authors offer a number of timely suggestions for increasing the effectiveness of regulation, concluding with a plea for a more complete recognition and use of the flexibility inherent in the three programs of control and better co-ordination in their employment.

Although the authors have sought to achieve a scientific impartiality, the tone of the presentation throws the reader almost immediately into a defensive position; this, together with the fact that in making their work fascinatingly readable the authors have occasionally sacrificed something of technical exactness, is responsible for an imposing array of question marks in the margins of the reviewer's copy—and this despite the fact that he is in accord with most of the book's conclusions.

The attack on judicial activity, if it is construed as an assault on the entire system of judicial review, has more validity and force than if it is construed as an attack on the character of the particular decisions under consideration. Blame is laid at the door of the Supreme Court that might much more properly (and more profitably, if hopes of influencing affairs are entertained) be heaped upon other government agencies. The picture of Congress striving hopefully and earnestly to control the trust movement only to find itself checked at every turn by a diabolical or incompetent judiciary is not convincing. Language more definitely (if not designedly) equivocal—more abounding in "weasel words"—than that adopted by Congress to express its antitrust policy in 1914 would be difficult to find. And in those rare instances where

Congress was exact, the Court is here criticized for respecting the exactness (pp. 48–49). Many will join in condemning the decision in the Steel case, without caring to accept the subsequent proposition that the recent merger movement has sprung to a measurable degree from the combination of this decision with those holding certain looser associations to be illegal. Circumstances may be consistent with a conclusion without dictating its acceptance. There are significant differences between consolidations, on the one hand, and associations formed for price-fixing or boycotting, on the other, differences which may have moved the Court, and which most certainly would prevent interested parties from regarding them as co-ordinate alternatives. Much of the evidence adduced in the antitrust chapters lends itself to other interpretations fully as reasonable as that given by the authors.

It is doubtful whether the recent "public interest" cases involving employment agencies, resale of theater tickets, and sale of gasoline are as damaging to the control program as this book suggests. Intrinsically, it is clear that they are not. As indicative of a new trend of judicial thought they are to be regretted, but it is yet far from certain that they are properly to be regarded as other than a temporary deviation—a mere "seasonal fluctuation." The discussions of valuation and control of operating expenses are sound, although not thoroughly convincing. It is futile to treat the wage-control decisions as constituting significant limitations on rate regulation.

The conclusions drawn from the public-ownership cases seem questionable. While public competition certainly operates to control affected private businesses, in none of the three cases was the issue of regulation before the Court in a form calling for a decision. Whether a suit could be so brought as to require a decision on the regulatory aspect is an open question. In any event a distinction should be drawn, both legally and economically, between "fair" and "unfair" public competition. Of course, serious extra-judicial limitations on the usefulness of this method are not difficult to suggest.

In this dangerous and fascinating field no author can hope to stir his readers without offering definite conclusions on specific issues; nor can he do the latter without arousing critics. This book has "teeth." It contains little that is new substantively, but it contributes a fresh and stimulating treatment of public regulation, and a significant emphasis upon the common purpose and essential unity of the several regulatory methods. Much of it is excellent, and as an entirety it is an important and successful piece of work.

BEN W. LEWIS

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The Tariff on Animal and Vegetable Oils. By PHILIP G. WRIGHT. Publication of the Institute of Economics of the Brookings Institution. New York: Macmillan Co., 1928. Pp. xviii+347.

As Dr. Moulton very aptly puts it in the Director's preface,

> There has been an abundance of abstract theorizing in the United States about free trade and protection and there has been no dearth of statistical evidence submitted by interested parties for the purpose of bolstering a theory or advancing a private interest, but there has been little dispassionate investigation of the concrete effects of particular tariff duties.

The present study is such an investigation dealing with a special commodity group of fats and oils.

The subject matter presented is of two sorts. A large portion of the book is devoted to a simplified presentation of the chemistry of the fats and oils and to the technology of the industries producing or consuming them. This serves as the background for the discussion of the effects of the tariff in the remainder of the book. In painting a picture of these effects, the author has done a notable piece of work. In painting the background, his hand is far less sure—indeed, makes some slips. On not a few points the experienced works chemist would disagree with him. However, these are matters of detail which do not affect the main picture presented, which the author has painted in bold, sure strokes. Indeed, the book would probably be simpler to read if it were stripped of some of the technological material which lies outside the author's personal experience, and which is really not always essential to an understanding of the main theme. These main themes, the author has handled in a very satisfactory manner; the book is an excellent example of the sound application of economic reasoning to rather intricate and controversial practical problems.

The conclusions reached are in part as follows: The duty on butter is only partially effective; it is beneficial to the dairy industry and burdensome to consumers, but raises domestic prices above foreign prices by an amount much less than the duty. The duty on olive oil is of little importance for protection, but has some revenue value. The duty on linseed oil, "supplemented by the marketing control exercised by the domestic crushers," maintains domestic prices above foreign prices by an amount greater than the duty. Domestic flax-growers reap price benefits in varying amounts, but on the whole much less than the duty on flaxseed. The duty on castor-oil beans benefits no one. The duties on the fish oils and on the animal fats (lard, tallow, the greases) are nominal. The benefit to dairy interests and to cottonseed- and peanut-growers—the interests chiefly responsible for increases in the oil

duties—from the duties on cottonseed, peanut, coconut, and soya bean oils has been at best small, while the burden on oil-refiners and soap-manufacturers has been considerable.

In an Appendix is presented an interesting and valuable treatment of the effects of a duty on price and output, with special reference to butter and flaxseed. It leads to the conclusion that, in each case, "production is likely to respond generously and imports to fall off sharply as a result of whatever price increase is brought about by the tariff." Accordingly, duties may be very effective in establishing national self-sufficiency in these products; but as a result of reactions upon domestic and foreign prices the net rise in price attributable to the tariff will be considerably less than the duty.

While this conclusion will excite no great interest among economists, the analysis on which it is based is noteworthy. The Appendix opens with a critical mathematical treatment of the theory of the effect of a duty on the domestic price. There follows a lengthy and critical treatment of the general problem of measuring elasticity of demand and of supply. The elasticities of demand and of supply for both butter and flaxseed are then computed from statistical data, using two slightly different methods, with the following results:

	Butter		Flaxseed	
	A	B	A	B
Elasticity of demand . .	−0.53	−0.52	−0.81	−0.80
Elasticity of supply . .	+1.65	+1.43	+1.88	+2.39

The data and methods employed in the statistical determination are not described in sufficient detail to permit a critical appraisal of the significance of the results. Wright comments on certain limitations of the data and concludes that "too much confidence should not be placed on the above numerical values, but it is believed that they may be accepted as affording strong evidence of elasticity of supply and inelasticity of demand for both butter and flaxseed." Inasmuch as Wright has used in the determination the relatively unfamiliar method of "path coefficients" developed by Sewall Wright, it is worth noting that this method, developed independently, is mathematically identical in its main features with the method of partial correlation.

In two further appendixes, the "equalizing rate" of the tariff act of 1922 (Section 315), whereby the final rate was to equalize the cost of production as between the United States and its principal foreign competitor, is subjected to sound criticism.

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Hand-to-Mouth Buying. By LEVERETT S. LYON. Washington: The Brookings Institution, 1929. Pp. xv+487. $4.00.

In this study, a wealth of statistical and verbal data, both published and unpublished, has been effectively organized and ably interpreted. After a brief but lucid introduction to the problem of hand-to-mouth buying, the order basis (ratio of average unfilled orders to shipments for the ensuing twelve months) is described for a number of single industries and for a number of industrial branches. The size of orders and of shipments is also studied for the business units which made their data available—mostly firms in the canning industry. This being the direct evidence bearing upon the problem, the effects and concomitants are then discussed. Of these, the stock burden (ratio of stocks to shipments or sales) is measured for a number of industries and of branches of trade, and the stability of business is studied with reference both to the flow of goods and to the level of stocks.

The data go back to 1919 in a few cases, but most of the series begin after 1921–22. The study is thus confined to the last decade, and it is not surprising that the conclusions are neither general nor definite. Since 1920 there has been a noticeable tendency toward restricted forward ordering, a larger percentage of small orders and purchases, and greater stability in the production, shipments, and stocks. But significant variations appear from one industry to another. It is an admirable feature of the book that it makes much of these differences, and presents the findings in copious detail. If, in consequence, the book is less interesting to the general reader, it is the more valuable to a student interested in the variety of business experience and critical of broad but misleading generalizations.

In view of the short period studied, the last part of the book, the discussion of buying policies in the past as revealed by trade-journal records for the drygoods, shoe, and other trades, is very enlightening. It is shown that hand-to-mouth buying existed in the past, and that purchasing policies followed the long swings in the general price level. The general price decline from the 1880's was accompanied by frequent recurrences of hand-to-mouth buying, while this practice was rather exceptional during the years 1900–1920. Other factors affecting the purchasing policies of business men, such as elements of style and means of communication and transportation, are discussed briefly in the last chapter.

One regrets that this treatment of factors affecting business buying, especially the treatment of trends in price levels, has not been developed in greater detail. Indeed, the only important criticism to be made

is that, while the study presents the evidence in full, it does not sufficiently analyze the determining and conditioning factors in the problem. Thus, the congeries of elements that go to make up the cyclical swing all bear upon buying policies, not only upon short-time changes in practice, but also upon certain aspects of trends in practice. The recent trend toward hand-to-mouth buying may be conceived in large part as a change from the violent cycle of 1919–21 to the milder swing of 1921–24, and to the still milder cycle of 1924–27. This feature does not come out in the discussion, and an impression is created that the ratios and verbal data are presented without full realization of the peculiar and limited character of the period sudied. On the other hand, it is not certain that a deeper analysis could be combined effectively with the full description of the situation, centered, as it is by the author, around the concept of hand-to-mouth buying *today*.

Despite this limitation, the wide range of the material and the admirable organization of the data make the study both valuable to business executives and stimulating to empirically minded economic students.

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The Small Loan Situation in New Jersey in 1929. By WILLFORD ISBELL KING. Trenton: New Jersey Industrial Lenders' Association, 1929. Pp. 101. $0.25.

In 1929, the New Jersey Legislature, by an amendment to the law governing small loan companies, reduced the legal rate on small loans from 3 per cent to 1½ per cent a month. The 3 per cent rate had been in effect since 1914, in which year New Jersey enacted a law, almost the first of its kind, regulating the business of making loans of less than $300. Under the 1914 law, the small loan business had developed steadily, and in 1928 there were 429 companies licensed to carry on the business of making small loans, with an investment of about $19,000,000. The reduction in rate which became operative in February, 1930 meant, as has since become evident, that nearly all of the companies would have to cease making new loans and retire from the state. Threatened with extinction, the companies determined to carry their case to the public.

Unfortunately for the companies, few influential people knew any-

thing about the business as no general description of it had as yet been published. The New Jersey Industrial Lenders' Association, the trade organization of those engaged in the small loan business, therefore, engaged Dr. King to make an impartial economic and statistical survey of the business in New Jersey. The expenses of the survey were born by the Association but the investigator was left entirely untrammelled in ascertaining and in reporting the facts. The selection of Dr. King was due to the desire of the Association to obtain a man of such standing that his conclusions would bear weight. As it happens, the writer of this review spent nearly three years investigating this business in the United States for the Russell Sage Foundation and conducted a somewhat similar statistical study which has just appeared in print. There is no question in the mind of the reviewer that Dr. King's study has been made without fear or favor and that the facts presented in his report constitute an excellent picture of the small loan situation in New Jersey.

Dr. King's investigations covered twenty-nine companies selected with due regard to geographical location, size, and ownership. In all, 24,846 borrowers were studied.

The most surprising thing to many would be the number of people who borrow from these small loan companies. Dr. King estimates that at any one time one married man in eight was a patron of some small loan company. This ratio would of course be increased if one considered the number of those who borrow during the period of a year.

The average loan was found to be $169.81. White borrowers on the average pay off their loan in 279 days, colored borrowers in 294 days. Dr. King states "that, in general, the borrower must put in four or five days to pay for the accommodation of having a loan amounting approximately to a month's income, and extending over a maximum period of about nine months."

Approximately one-fifth of the borrowers were employers or self-employed, four-fifths employees. Manual workers including servants made up five-ninths of the borrowers and borrowed about one-half of the money. Colored borrowers were found in excess of their numbers in the population, 12 per cent as against 4 per cent, a situation due no doubt, as the author says, to the fact that the negroes as a class belong largely to the group most likely to borrow. Dr. King takes pains to point out that the borrowers do not constitute, as some seem to believe, the flotsam and jetsam of humanity but are persons with income and ability to repay if the terms are adjusted to their conditions.

The most important reason for borrowing is to meet current household and miscellaneous expenses. Nearly one-fifth gave this as the reason for borrowing. The second most important reason given was to consolidate and liquidate existing debts. No information was obtained as to how these debts arose. Dr. King believes that fully one-half of the loans are made for the purpose of paying off other creditors. Occupation naturally has some effect on the reason for borrowing. One-third of all loans by non-professional business men are made for business purposes. Employees, of course, make few loans for this purpose.

The survey included a study of exchanges, set up by the companies, to protect themselves from particularly bad risks and to prevent customers from overloading. Personal interviews with borrowers in their homes were also made to obtain their point of view with respect to the business. With few exceptions, the attitude of the borrowers was distinctly favorable to the companies. They testified to fair treatment and to benefits received from the loan.

Incidentally, it may be of interest to remark that the amendment reducing the rate was not repealed in 1930 and that the companies are gradually collecting their funds and closing down. Dr. King's survey clearly shows the importance of credit institutions to which people without bankable collateral or powerful friends can turn in times of emergency. Had the people of New Jersey been fully cognizant of the facts contained in this study it is doubtful if any such ill-considered legislation would have passed.

LOUIS N. ROBINSON

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The Evolution of War. By MAURICE R. DAVIE. New Haven: Yale University Press, 1929. Pp. x+391. $4.00.

The author of this book has made a valuable contribution to the study of war through assembling a considerable array of facts and even more quotations under a classification which will enable future investigators to find them. One has before him instances of war-making to increase the supply of human meat, of human sacrifices, and of human slaves; war-making for blood revenge, for trophy heads, and for glory; war-making for land, for cattle, and for women. One can also turn to cases where tribes fight to exterminate each other, where they fight for sport without great damage, and where they fight as a formal rite.

Primitive rules of warfare, treatment of prisoners of war, types of weapons, and strategy are other subjects considered.

Leaving criticism of the facts to the anthropologists, one can raise the question whether the method is calculated to present a wholly adequate picture of the motives of primitive warfare. One often feels that instances are cited out of context and that the motives of action cannot be understood until one has before him the place of warfare in the entire culture of the tribe. This criticism is one extremely difficult to avoid in a comparative study, yet suggestions as to the function of war in typical cultural patterns would have been informing.

Furthermore, the method of citing instances is likely to give a false impression of the statistical situation. This book leaves the impression that primitive warfare is almost universal, is generally very bloody, and usually has an economic motivation in the sense that it has been made to acquire heads, bodies, cattle, land, slaves, or other material things considered valuable. Instances are given of tribes that do not fight or who fight by champions or without serious casualty. Instances are also given of war for sport, for prestige, for revenge, or for other motives not usually classed as economic. Other writers on the subject have suggested that these latter types of war are the most common and that economic war has a comparatively limited distribution. Attempts at more precise quantitative analysis would be interesting.

In the concluding chapter the writer stresses the function of war in societal evolution. He finds it the means of keeping population down, of promoting cultural dispersion, of stimulating inventiveness in social organization and technology, and of preventing indolence and stagnation. He believes that with the advance of economic, political, and social organization war becomes less and less useful, and more and more wasteful. To him progress is marked by the steady encroachment, not only of industrialism upon militarism, but also of co-operation upon competition. Thus the writer goes farther than Spencer or Sumner, indebtedness to whom he frequently admits, and verges on the philosophy of Kropotkin. He is convinced of the continuity between primitive and civilized warfare, and his book is full of suggestions for studies of the latter.

The statements are witnessed by voluminous citation, and the book includes a long Bibliography in which, however, some well-known names, like Malinowski and Fay-Cooper Cole, do not appear.

QUINCY WRIGHT

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The Iron Industry in Prosperity and Depression. By HOMER BEWS VANDERBLUE and WILLIAM LEONARD CRUM. Chicago: A. W. Shaw Co., 1927. Pp. xiv+193. $3.00.

This volume, written in 1926, presents in the main statistical analyses of an industry which has claimed perhaps more than its share of attention as an indicator of general business. As the authors point out, the important rôle played by the iron (and steel) industry is due not only to its magnitude, and "its close interlocking with every branch of the modern economic organization" as a consumer of materials and labor, but to its being one of the "basic group" of industries, a supplier of raw materials and more finished products to most other industries. Furthermore, because in its latter rôle it exhibits extreme sensitiveness to conditions in the markets for capital goods, and because the industry has supplied the world with an exceptionally full and long-continued volume of statistics, economic statisticians have seized upon it as one of their "basic" raw materials in another sense. Seers, quite as much as their less inspired followers, want (need) things writ large; this famous "prince-and-pauper" industry has always written, and in the years 1929–30 has still been writing, its story of good and bad times in streamer type.

Space limitations permit only a cursory summary of the book in hand. The volume is divided into three main parts and an Appendix. Of these, Part II is by far the most interesting. Parts I and III and the Appendix all deal in greater or less degree with steel output and prices and the movements thereof, as well as data on pig iron itself. Between them they give the statistical background for studies of "cycles" in iron and steel, such as could form a part of, or be related to, studies of general business cycles. Part I gives useful running accounts of the main historical events covered by the statistical data presented. The Appendix includes some elementary instruction on technical statistical methods. Part III, entitled "Forecasting Conditions in the Industry," interrelates such items as prices of pig iron and of iron and steel scrap, pig-iron and coke output, and unfilled orders and earnings of the United States Steel Corporation, so as to bring out the relative timings of fluctuations and turning points in these several statistical series. The final chapter in Part III presents series indicating changing demands for iron and steel, in the railroad, the construction, the automobile, and the oil industries, and rightly concludes that "the forecasting problem in the iron and steel industry is reduced . . . . to the use and interpretation of certain series arising within the industry itself."

Part II is devoted to "Regional Production of Pig Iron." This brings together, as no other book has done, data showing the shifts in the locale of pig-iron production over a period of eighteen to twenty-five years. Even in this relatively short time there has been a "relentless shift," a "persistent migration" "from the North Atlantic region toward the industrial areas along the Southern shores of Lake Erie and Lake Michigan," as well as "vigorous growth" around Birmingham. Not only does Part II show, by data on furnaces in operation and on output, the trends of these shifts, but, what is equally if not more interesting, the similarities or marked differences between the cycles of iron output in the various regions covered. This part deserves much more extended comment than can be given to it here. The authors of course intersperse tables, maps, and charts with interpretative comment on the data. It seems to the reviewer that one of the principal criticisms of the book is to be made of this part; namely, that all too little is said of the influence of the consuming industries—in other words, of demand and its geographical shifts and cyclical movements—on both the regional trends and the regional cyclical fluctuations portrayed. This in spite of the concluding sentence of the preceding paragraph.

While at times the book is fairly tantalizing to a student in its failure to go just one step farther in analysis, and while issue may be taken with some of its premises and conclusions (and with a few typographical errors), it presents a unique study in highly valuable and decidedly readable form. Many an industry's executives might well wish that they had at their command similar volumes of data equally well digested, for their own industries. Indeed, one may suspect that the book was written for executives *in esse*, or in the making, more than for academic students as such.

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